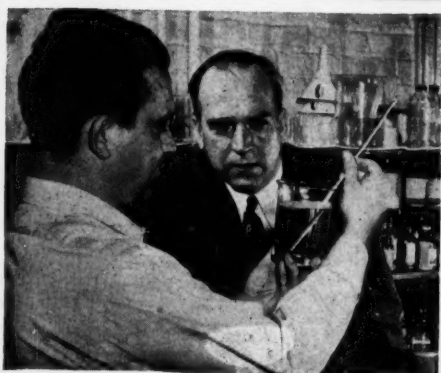


# Chemical Week

February 28, 1953



Profile of the process industries; statistics sketch past growth, present status . . . . . p. 34

► East meets West as U.S. chemical firms invest money and know-how in Japan's industry . . . . . p. 16

► One sound way to sell detergent bases: give customers a "crash course" on using them . . . . . p. 75

Behind the fury of the fiber fight is a sharp shift in chemical buying patterns . . . . . p. 82

► Barnacles by the ton clog ocean lanes; keeping them off hulls is big business . . . . . p. 87

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# Chemical Week

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February 28, 1953 • Chemical Week

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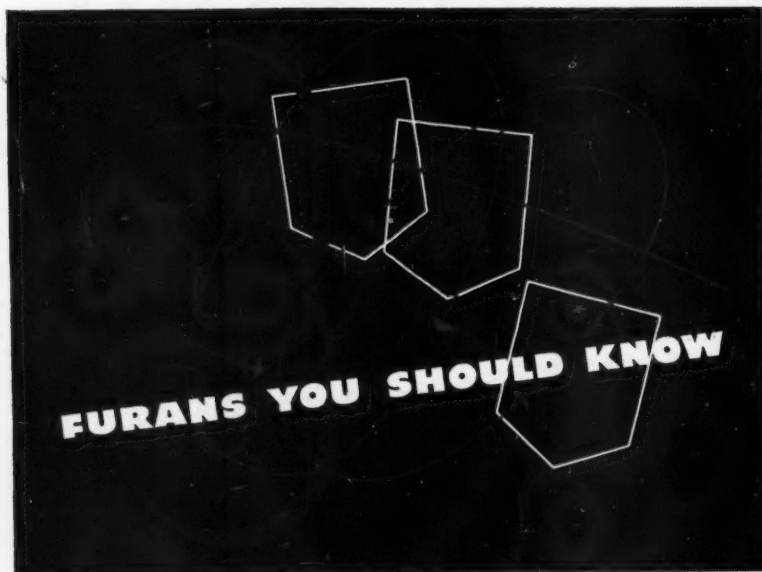
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## OPINION....

### Enjoyable to Page 65

TO THE EDITOR: I was thoroughly enjoying the Feb. 14 issue when I reached p. 65 and read your article entitled "Building a Better Fuel Oil," and the omission of our company and its products, Drew FOT-W and Drew FOT-CS, put me in a "letter-to-the-editor" mood.

Our company has been a pioneer and a major factor in the field of fuel oil additives, and . . . our paper on this subject which appeared in . . . Oct., 1951, will prove of real interest to you in establishing our claim to a front rank in the fuel oil treatment field.

At this time our research laboratories at Boonton, N. J., are continuing their study of this complex subject and meanwhile many of the most important industrial plants in the United States and virtually 1,000 or more vessels are using Drew products for conditioning their fuel oil.

I hope you will be good enough to add our name to those mentioned in your article.

E. A. LOWENTHAL  
Midwestern Manager  
E. F. Drew & Co., Inc.  
Chicago, Ill.

*Drew, of course, should have been mentioned, Reader Lowenthal, although our listing didn't pretend to be comprehensive.—ED.*

### Canon Clarified

TO THE EDITOR: You state (Feb. 14) that the Rev. Jerome Drolet, of the Louisiana Social (Catholic) Action Committee has declared that "strike-breaking is a sin." While you have reported this fairly, merely as a news item, an implication can be drawn that the statement of this priest represents Catholic doctrine regarding strikes, and I trust, therefore, that you will give editorial space to clear this point.

Persons joining Catholic Action groups are instructed that Catholic Action is distinct from political action, and that its function lies in the principles of right and wrong rather than in taking sides on secular methods. Priests can be active advisers on matters of faith and morals, but they

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: W. A. Jordan, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

DEWEY AND ALMY CHEMICAL COMPANY • CAMBRIDGE, MASS.

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# DIOP

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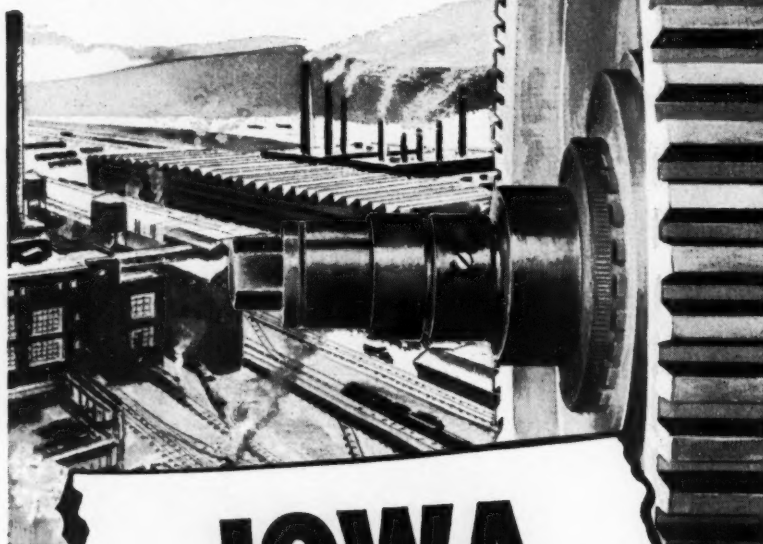
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### IOWA DEVELOPMENT COMMISSION

## OPINION. . . . .

are expressly forbidden by Canon 139 of the Church law to accept public offices. To make this more clear in this country, Law No. 83 of the Third Plenary Council of Baltimore *commands* priests to abstain from public discussions of political or secular matters, either in or outside of a church, and forbids clerics from giving judgments of a civil nature. The laws of a Plenary Council are binding on priests in all dioceses of the country, and no Bishop can dispense from a plenary law.

A priest who engages in personalities with citizens in public life must be prepared to be treated as any other layman or politician, and in doing so he may bring criticism or ridicule on his fellow priests, thus lessening the dignity of his office. Canon 139, par 1, directs that priests must avoid such conduct.

I am not expressing any opinion on the right or wrong of the rubber strike; I am merely indicating that in this country, where strikes involve labor laws and public action, priests are forbidden to take sides or make public pronouncements that go beyond matters of faith and morals. Thus the public statement of the Rev. Jerome Drolet is not subject to obedience by Catholics. To qualify the pronouncement with the statement, "when a strike is just," is begging the question and does not absolve the priest from his obligation to obey the Canon law. It is very difficult for an individual to know when a strike is just. A strike brought about by one or more contentions usually has other devious points of pro and con behind it, difficult for an outsider to judge fairly. The statement that "strikebreaking is a sin" is decidedly questionable. In my past experience as Deputy Administrator of the NRA, I have seen some cases where it was evident that the strike itself was the sin.

GEORGE S. BRADY  
Industrial Materials Service  
Washington, D. C.

## Anti-Pollution Aid

TO THE EDITOR: Re the bills (H. R. 234, 606) pending for rapid amortization of waste-treatment facilities. . . . Encouragement should be given to the Congress to make this proposal effective as soon as possible.

Even . . . big companies . . . are reluctant to make the capital investment involved in purchasing such equipment. I am sure that many of them would proceed immediately if they were assured of writing off such expense in five years.

It probably would be a help if a

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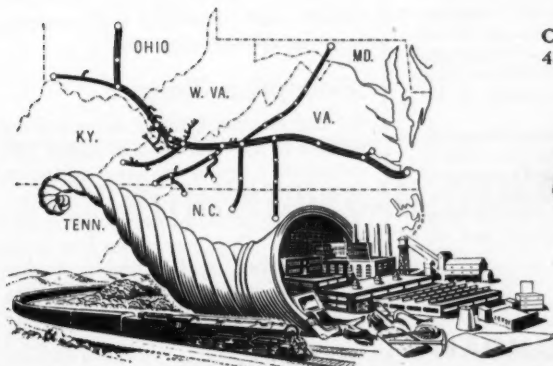
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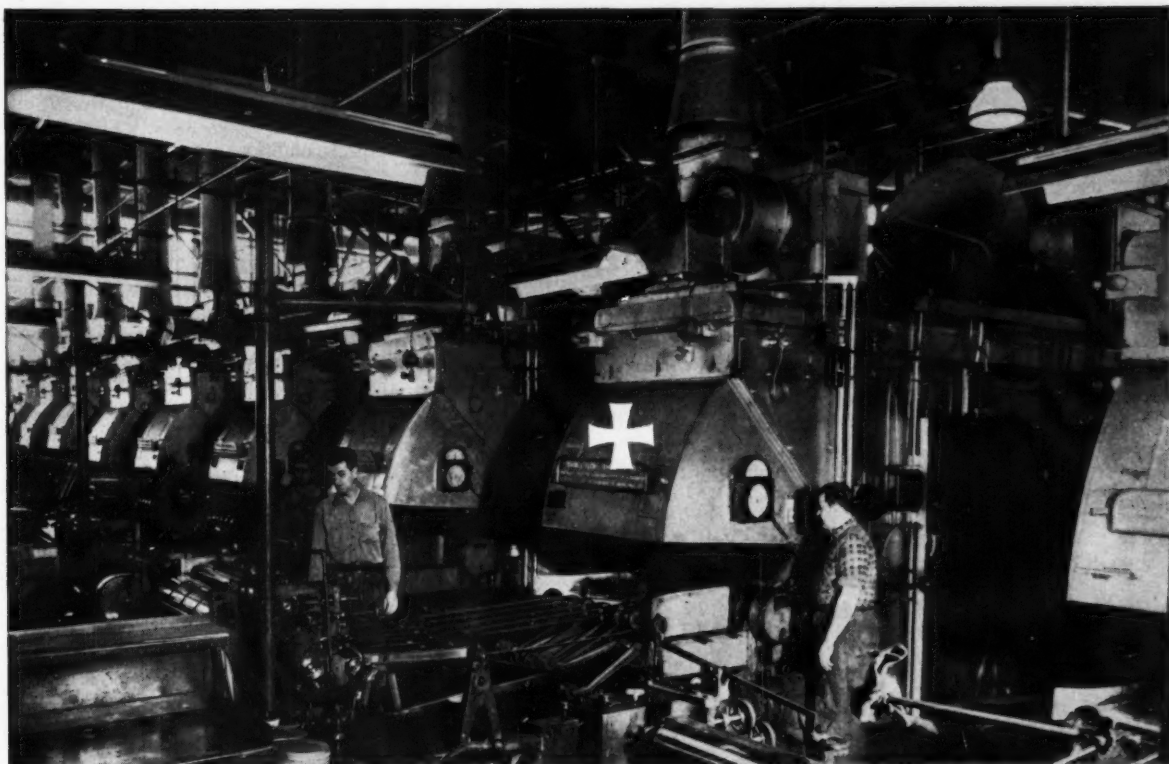
*History and Progress go  
 hand in hand in the Old Dominion*

Within the very shadow of a marker to John Rolfe, English husband of the beloved Pocahontas, the National Aniline Division of Allied Chemical Dye Corporation is erecting a new synthetic fiber plant. The sketch of the building pictured above is the architect's conception of the proposed laboratory and administration facilities. Thus, the most modern process in the textile fiber industry will come alive, in 1953, at Bermuda Hundred which in 1614 became the first incorporated town in Virginia. It is the privilege of the Virginia Electric and Power Company to supply the vital electric power to the Richmond - Petersburg - Hopewell area, of which Bermuda Hundred is a part. Already serving an impressive list of industries, including tobacco, chemicals, luggage, optical goods, paper, rayon, cellophane, and many others . . . VEPCO is proud to supply power-

Here, on land hallowed by the enterprise of early Americans, is evidence again that good business management is the nerve system of America's *Industrial domain . . .* spreading from *local communities* which are its heart and core.

6

## Chemical Week • February 28, 1953



Modern equipment like these drying ovens helps Continental lithographers do a superior job

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### OPINION. . . . .

tack by Synco adhesives on wood joint surfaces and all indications are that the joints so made are more durable than the wood itself under various test conditions . . .

While many of the strongly acid phenolic glue bonds are resistant to . . . exposure conditions, they generally show deterioration with indications of higher percentage of wood failure when continuously exposed to elevated temperatures (around 160 F). This constitutes the major evidence in support of the claims that acid-catalyzed wood bonds have questionable durability. Synco glues do not fall into this category . . .

In your article, you stated that one of the most urgent problems confronting the wood laminators is . . . "finding a dependable, completely waterproof glue that can be set at room temperature in a cold press. Or more immediately, a phenolic that would set at 200 F or below." That problem is solved . . . We have succeeded in developing a durable room-temperature-curing phenolic adhesive . . .

S. SPIWAK

Technical Director  
Snyder Chemical Corp.  
Bethel, Conn.

### Austin Booster

TO THE EDITOR: I noticed in your Feb. 7 issue . . . a discussion of the new aluminum producers. This article states . . . "The big snag: finding plant sites where power is plentiful and cheap."

The Austin area of Central Texas, with its tremendous deposits of lignite coal, offers just this. As you undoubtedly know, the Aluminum Company of America has just located a plant at Rockdale, Texas, some 80 miles north-east of Austin.

In view of the fact that the extensiveness of these deposits does not seem to be known to the chemical industry, I thought it advisable to write and bring it to your attention.

HUGH W. BRANCH  
Manager, Industrial Development  
Austin Chamber of Commerce  
Austin, Texas

### DATES AHEAD . . .

Nat'l Electrical Mfrs. Assn. Edgewater Beach Hotel, Chicago, Ill., March 9-12.

Nat'l Assn. of Corrosion Engineers, 1953 conference, Chicago, Ill., March 16-20.

Amer. Trade Assn. Executives, Spring meeting, Mayflower Hotel, Washington, D.C., March 19-20.

# U.S.I. CHEMICAL NEWS

February 28

★

A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries

★

1953

## "Whitewashing" Saves Teeth by Stimulating Re-growth

A new method for repairing and saving dying teeth by "whitewashing" them with calcium hydroxide was described at a recent dental conference. By application of the method, it is said to be possible for dentists to save fractured, broken, or badly decayed teeth which otherwise would have to be extracted or de-nerved.

The method consists of first cutting away diseased portions of the tooth pulp—the innermost portion of the tooth which surrounds the nerve. Exposed pulp is then coated with calcium hydroxide in a methyl cellulose paste. Calcium hydroxide stimulates the growth and replacement of dentine, the semi-hard part of the tooth just under the enamel. Function of the methyl cellulose is to hold the stimulant in place long enough to be effective. Within two weeks, x-ray pictures show that new dentine has been formed, after which the usual cavity filling materials can be used to repair the hard outside covering of the tooth. Without the replacement of dentine prior to filling, the tooth would be subject to further decay and fracture, it is said.

## Easy Lab Trick Makes Pyrex Glass Invisible

A novel method was suggested recently for distinguishing between soft and Pyrex glass tubing. Such a check is often necessary in sorting tubing in a stockroom or in making certain that two pieces are the same before they are sealed in a flame. The trick is to mix 59 ml. of carbon tetrachloride with 41 ml. of benzene. The result is a solution with a refractive index approximately that of Pyrex glass. When an assortment of pipettes or other tubing is placed in the solution, the Pyrex pieces will be invisible while the soft glass pieces will be clearly visible. Another mixture which is said to work equally well can be made by mixing five parts of benzene and one part of ethyl alcohol.

## New B<sub>12</sub> Feed Supplement

A new, improved form of vitamin B<sub>12</sub> is now available to the feed industry as a result of U.S.I.'s improved processing techniques. The new product is 12 mg. per pound Feed Supplement. U.S.I. is continuing production of its 6 mg. per pound Feed Supplement which has been available for some time.

## World-Wide X-Ray Studies

A survey of world-wide work currently going on in exploring the atomic structure of solid matter by the use of x-rays is presented in a recent government report. Included are 16 papers given by authorities from the United States, England, France, and Germany at a conference on the applications of x-ray spectroscopy to solid state problems.

## New Pyrenone Slurry Formulation Saves Stored Seed From Insects, Does Not Affect Food or Feed Use

U.S.I.'s Well Known Insecticide in Wettable Powder

Form Allows Slurry Treating in Present Equipment;

Can Be Combined with Accepted Fungicides or Used Alone

For the first time, seed dealers and processors are now able to slurry-treat grain stocks against insect infestation without committing the stock to seed use

### Oral Administration of Methionine Found to Improve Dark Adaptation

Recent research has shown that oral administration of methionine brings about an improvement in dark adaptation—the ability of the eye to become adjusted for night vision. The improvement is apparent within an hour and lasts for a period of 24 to 32 hours, it has been found.

This represents a new and unusual application for methionine. It has been known for some time, however, that methylating agents such as vitamin B<sub>12</sub> and methionine are involved in the utilization of vitamin A. Further clinical work will be necessary before final conclusions can be drawn.

The use of methionine to improve dark adaptation may prove to be important in high altitude aviation operations as well as in marine operations involving concentrated night watch duties.

alone, by using U.S.I.'s latest development in agricultural chemicals—Pyrenone® Seed Protectant (Slurry). Already familiar to grain farmers and dealers, Pyrenone Grain Protectant in dust form was first introduced on a limited scale by U.S.I. in 1950. It was made available nationally a year later and met with immediate and enthusiastic acceptance. With it, farmers can obtain season-long protection against insects with only one simple treatment, even when the grain is stored in open cribs or bins. No masks, gloves, or other special safety measures have to be taken, and the treated grain is entirely safe to use either as feed or food.

The new formulation of Pyrenone Seed Protectant (Slurry) makes this same protection available to seed dealers and processors in an even more convenient form. It can be applied to grain in present slurry treating equipment, and it can be used alone or in combination, with all the well known fungicides. Tests in combination with such ma-

**MORE**

\*Reg. U. S. Pat. Off.



A scene in a modern seed processing plant showing equipment for slurry treating seed stocks against insects and fungus. Seed is metered from hopper at the top, dropped into mixing chamber at left, and slurry is automatically added from the storage tank at the right. Seed is mixed by a series of baffles or brushes and is bagged immediately after treatment.

February 28

★

# U.S.I. CHEMICAL NEWS

★

1953

## CONTINUED

## Seed Protection

terials as Spergon, Arasan, Thiram, Phygon and Orthocide 406 have proved that Pyrenone is compatible with these fungicides and that it offers no hazard to germination of the seed. Only one pound of Pyrenone Seed Protectant (Slurry) is needed to protect 100 bushels of seed against elevator and warehouse insect pests for an entire storage season.



U.S.I.'s New Pyrenone Slurry Formulation is a safe solution to the insect problem in seed warehouses and elevators.

A further advantage to seed dealers is the fact that seed treated with Pyrenone Seed Protectant (Slurry), but not with fungicide, can be used for feed or milling purposes. Other insecticide treatments leave the grain unfit for any use except seed. This often means a loss to dealers and processors who find at the end of the season that they have overestimated demand for a particular grain or variety. Now with wettable Pyrenone Seed Protectant (Slurry), the dealer can treat all of his seed against insects as he receives it. He can include a fungicide treatment, either at the same time or later, to as much of the seed as he desires. At the end of the season, he can sell any surplus (not treated with fungicide) for human or animal consumption, or he can store it for an indefinite period.

Exhaustive tests in both U.S.I.'s laboratories and in the field have shown Pyrenone to be

## Vacuum Metallizing Yields Low Cost Coating Method

Metallizing by vacuum evaporation, a comparatively new method for giving brilliant finishes to plastics and metals, is growing rapidly in popularity, according to a recent report. Principal factor responsible for its increasing use is said to be the triple advantage of providing bright finishes at extremely low processing costs with economical consumption of critical metals. Articles to be coated are placed on suitable jigs and introduced into a chamber which may consist of a bell jar, or in large industrial units, a steel tank. A small amount of the coating metal is placed on filaments arranged in the chamber, and the chamber is then evacuated. Low voltage current fed to the filaments vaporizes the coating metal which condenses on the articles to form the coating. When the coating is applied to only one surface, the article may be held stationery. When a number of surfaces must be coated, or where irregularly shaped pieces must be covered completely, rotary jigs are employed.

Thickness of the film is usually four millionths of an inch, and 25,000 square feet of surface can be covered with one pound of aluminum. In the case of plastics or other non-metallic base materials, vacuum evaporation is said to provide an ideal conducting base for subsequent build-ups by conventional electroplating.

## New Book on Lab Safety

A new edition of a laboratory safety manual was recently announced for free distribution to all interested persons. The 48-page illustrated book has chapters on accident prevention, first aid, fire prevention, and safety equipment. It also contains a comprehensive list of rapid treatments for laboratory mishaps, both external and internal.

entirely free of toxic hazards. Employees in seed processing plants, dealers and farmers who handle the seed, and even the seed itself remain safe without special safety precautions.

## TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U. S. I.

**A new, all-purpose metallic repair compound** reportedly requires no heat or mixing, withstands up to 150 lbs. per sq. in. when set, is flame resistant, alcohol and waterproof, sticks to aluminum, and can be used to repair such items as engine blocks, jewelry and tools. (No. 891)

**A redesigned model of a flash-point tester** called for in many paint and oil industry test specifications has a built-in gas or electric heater, non-tippable cup, and a special slow speed stirrer. (No. 892)

**A new wallpaper paste**, for application to the wall instead of the paper, is claimed to stick to almost any surface without sizing and can be reactivated on the wall simply by applying water. (No. 893)

**A pocket hardness tester** is said to give direct readings accurate to 1.5 points for metals and alloys in the range of 25 to 65 Rockwell 'C' scale. Unit consists of microball indenter, microscope to measure indentation, and a standard hardness test block. (No. 894)

**A new "pocket-size" laboratory pump** weighing 4.5 lbs. produces either air up to 10 lbs. per sq. in. pressure, or a vacuum of 12 in. of mercury. No larger than a liter beaker, unit can be moved easily for filtering, air stirring, aeration, gas circulation, etc. (No. 895)

**Aluminum in the forms of plastic putty and liquid plating compound** is now available. Former can be modeled like clay, air-dries to tough, durable metal which can be machined, drilled, etc., like solid aluminum. Plating compound plates wood, metal, plaster, leather, without chipping or peeling, air-dries quickly, according to the manufacturer. (No. 896)

**Resistance to all types of chemicals, solvents, corrosive materials**, reportedly can be had on lab bench tops, valves, other chemical plant hardware, with a black or clear coating which air-dries or bakes under infrared lamps. Finish is also claimed to have long-term weather durability on wood. (No. 897)

**A new chemical brushing compound for aluminum and its alloys** is said to change the metal's surface to a non-metallic, tough, paint-receptive layer which anchors paint firmly, protecting the metal from corrosion. (No. 898)

**A de-icing fluid in a "squeeze-it-on" bottle**, now available for motorists, can be applied to windows when icing conditions start to eliminate need for stopping to scrape off ice, the manufacturer claims. (No. 899)

## PRODUCTS OF U.S.I.

### ALCOHOLS

Amyl Alcohol (Isoamyl Alcohol)  
Butanol (Normal-Butyl Alcohol)  
Fusel Oil—Refined  
Propanol (Normal-Propyl Alcohol)

### Ethanol (Ethyl Alcohol)

Specially Denatured—all regular and anhydrous formulas  
Completely Denatured—all regular and anhydrous formulas  
Pure—190 proof U.S.P.,  
Absolute—200 Proof  
Solox®—proprietary solvent—regular and anhydrous

### ANTI-FREEZE

Super Pyro® Anti-Freeze  
U.S.I. Permanent Anti-Freeze

### ETHERS

Ethyl Ether, U.S.P.  
Ethyl Ether, Absolute—A.C.S.

### ACETONE—A.C.S.

### ANSOLS

Ansol® M  
Ansol® PR

### ACETIC ESTERS

Amyl Acetate—Commercial and High Test  
Butyl Acetate  
Ethyl Acetate—all grades  
Normal-Propyl Acetate

### OXALIC ESTERS

Dibutyl Oxalate  
Diethyl Oxalate

### PHTHALIC ESTERS

Diamyl Phthalate  
Dibutyl Phthalate  
Diethyl Phthalate

### OTHER ESTERS

Diatol®  
Diethyl Carbonate  
Ethyl Chloroformate

### RESINS (Synthetic and Natural)

Arochem®—modified types  
Arodure®—urea-formaldehyde resins  
Arofen®—pure phenolics  
Aroflat®—for special flat finishes  
Aroflint®—room temperature curing phenolic  
Aroplaz®—alkyls and allied materials  
Arapol®—copolymer modified alkyls  
Ester Gums—all types  
Natural Resins—all standard grades

### INSECTICIDE MATERIALS

Allethrin  
CPR Concentrates: Liquid & Dust  
Piperonyl Butoxide  
Piperonyl Cyclanone  
Pyrene® Concentrates: Liquid & Dust  
Pyrethrum Products: Liquid and Dust  
Rotenone Products: Liquid and Dust

### INSECTIFUGE MATERIALS

Indalone®  
Triple-Mix Repellents

### INTERMEDIATES

Acetoacetanilide  
Acetoacet-ortho-chloroanilide  
Acetoacet-ortho-toluidide  
Acetoacet-para-chloroanilide  
Ethyl Acetoacetate  
Ethyl Benzoylacetate  
Ethyl Sodium Oxalacetate

### FEED PRODUCTS

Calcium Pantothenate (Feed Grade)  
Curbay B-G®  
D.L. Methionine (Feed Grade)  
Niacin, U.S.P.  
Riboflavin Concentrates  
Special Liquid Curbay®  
U.S.I. Vitamin B<sub>12</sub> and Antibiotic Feed Supplements  
Vacatone® 40

### OTHER PRODUCTS

Acetaldehyde  
Caustic Soda  
Ethylene  
IPC (Isopropyl-N-Phenyl Carbamate)  
CIPC  
Liquid Chlorine  
Metallic Sodium  
Methionine (Pharm.)  
Nitrocellulose Solns.  
Propionaldehyde  
Propionic Acid  
Sulfuric Acid  
Urethan, U.S.P.

\*Reg. U.S. Pat. Off.  
†Trademark Pending

# U.S.I. INDUSTRIAL CHEMICALS CO.

Division of National Distillers Products Corporation

120 BROADWAY, NEW YORK 5, N. Y.

BRANCHES IN ALL PRINCIPAL CITIES

## NEWSLETTER

Legislation to give the Food and Drug Administration the right to go into plants for inspection purposes (CW Newsletter, Feb. 7) is already in the Congressional hoppers. Identical bills introduced in the House by Rep. Wolverton (H.R. 2769) and in the Senate by Sen. Smith (S. 835) would amend the Federal Food, Drug, and Cosmetic Act by striking out the words "after first making request and obtaining permission of" and substituting "after first giving written notice to."

The bills are now in committees—Interstate and Foreign Commerce in the House, Labor and Public Welfare in the Senate.

Also under deliberation, by the U. S. Supreme Court, is Atlas Powder's petition asking for a review of the bread emulsifier case.

The earliest time the Court could act is March 9, but it's more likely that a decision won't come down for weeks thereafter. In the meantime, the stay granted by the U. S. Circuit Court in Philadelphia permits Atlas to sell, and bakers to use, the controversial product, Myrj 45.

Although the torrent of certificates of necessity has now slowed to a trickle, a few chemical requests are still getting approval:

- Belle Alkali Co. (Belle, W. Va.), \$470,000 for methylene chloride (\$419,000 at 60%, the balance at 70%).
- Celanese Corp. of America (Belvidere, N. J.), \$1.2 million at 55% for formaldehyde.
- Monsanto Chemical (Monsanto, Ill.), \$945,000 at 70% for phosphorus oxychloride.
- Air Products (Emmaus, Pa.), \$28,000 at 60% for oxygen.
- E. Rauh & Sons Fertilizer (Tuscola, Ill.), \$916,000 at 45% for phosphatic fertilizer.

Look for burgeoning interest in "high-surface sodium"—metal deposited on an inert carrier (alumina, carbon, soda ash, etc.) to provide large surface area, short reaction times, close temperature control.

The development opens up possibilities of continuous processing, and National Distillers foresees potential processes for hydrocarbon refining and reduction of titanium tetrachloride to the metal.

Look too for introduction soon, by Owens-Corning Fiberglas, of resin-coated Fiberglas window and door screens. They'll come in olive drab and aluminum color. Cheaper than bronze or copper, the new screens will cost about the same as plastic ones now on the market.

And around May drug firms will get a look at a new device to dispense their products. The De Vilbiss Co. (Toledo) will bring out a pocket-size nebulizer developed in conjunction with the Air Force. It will be the first pocket-size nebulizer on the market.

Made of polystyrene and to sell for approximately \$5, the nebulizer is claimed to be more effective than atomizers. It emits a fog rather than coarse droplets; thus the medication gets around corners, penetrates more deeply into the lungs.

New England industry is interested in the outcome of hearings this week before the Federal Power Commission on the fight between Northeastern Gas Transmission and Algonquin Gas Transmission over the franchise to supply natural gas to parts of the area not now served.

Northeastern says it can supply the area cheaper, since its lines already extend into Massachusetts (Algonquin's presently end in New Jersey). It has taken its case to "court" through newspaper ads.

Whether its claims can be proved, and regardless of the outcome, the Yankee chemical industry's only stake in the matter is fuel costs. And the price of gas isn't the only factor, since availability of gas may also affect the price of coal.

Will the Swiss Government keep the papers or will the U. S. Government get to see them? On that issue hangs the fate of General Aniline & Film Corp., assets of which amount to \$100 million.

The papers in question, says I. G. Chemie, which claims ownership of GAF, prove that German interest in the firm ended before seizure, and hence it was not an enemy company. U. S. District Court Judge Bolitha J. Laws says that I. G. Chemie must produce the papers, despite the Swiss Government's refusal to release them.

Unless I. G. Chemie produces the papers within 30 days, its claim will be dismissed; few obstacles will then block a clear title for the U. S. Government, and disposal of the property will be speeded.

Here's how one chemical company gets expansion money. Dow Chemical, in revealing its plans to continue expanding at its present \$100-million-a-year clip, says it will obtain sufficient financing by selling common stock under its employees' stock purchase plan and its present stockholders' subscription rights.

Implementing its annual forecast of the state of industrial research in the year ahead, National Industrial Conference Board, Inc., placed a sensitive finger on the collective pulse of 107 manufacturing companies, detailed the prognosis in this month's "Conference Board Business Record".

It's a stable picture, pinpoints no major policy shifts—

- Ratio of research outlay to sales exceeds the 1952 mark in more than two-thirds of firms reporting; only 8 companies revealed slipping research and development-to-sales ratios.

- Distribution of research expenditures for different R&D activities will be about the same in 1953 as it was last year.

- Look for a continuing shortage of chemists, physicists and engineers—especially new graduates.

- Starting salaries for technical personnel will remain high—in the \$320 to \$375-a-month range for a B.S.

Moderate is the word for the upward trend in R&D-budgets. Leaps in R&D-to-sales ratios over 1952 levels are not always proof of stepped-up research activities. Reason: lower sales coupled with only slightly higher R&D budgets, in some cases, cause the apparent contradiction.

Significant in production trends are the technological advances being chalked up in the field of automation (CW, Dec. 27, '52). This week Perkin-Elmer (Norwalk, Conn.) is introducing two new infrared spectrometers for continuous analysis of plant streams.

Not the first on the market, they're the first for infrared-pioneer Perkin-Elmer, and the firm thinks they're out in front on some counts. American Cyanamid is grabbing the initial batch of several instruments for its now-building nitrogen products plant at New Orleans.

**. . . The Editors**

# How porous *do you want your* catalyst supports?

Norton catalyst supports come in two types:

**1. If your process calls for coated catalyst supports,** you get what you want from Norton medium-porosity spheres. They have a porosity of 30-35%, with a rough, open surface structure. This gives you maximum adherence of catalyst to surface.

**2. If you need supports for impregnation,** Norton high-porosity spheres are your choice. Their porosity is 42-47% with large, connected, internal pores uniformly dispersed throughout the support. This gives you maximum deposition of catalyst.

**You also have a choice of sizes and shapes.** Norton spheres are available in diameters of  $\frac{3}{16}$ " to 1". Other Norton catalyst supports, in ring and pellet form, available in diameters of  $\frac{1}{8}$ " to 2".

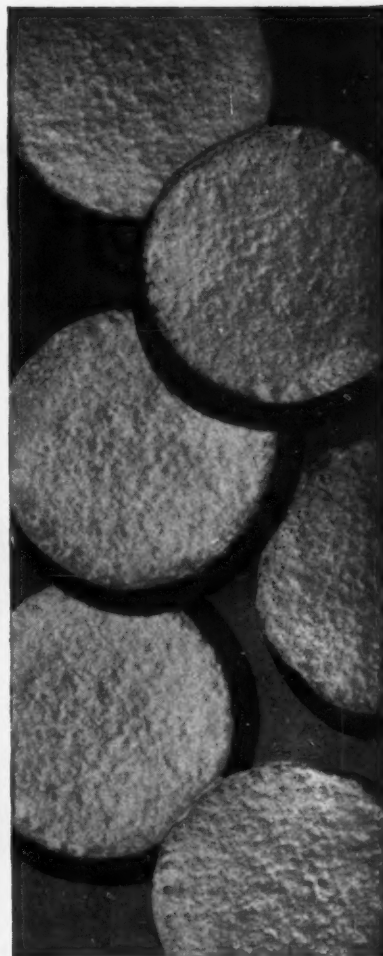
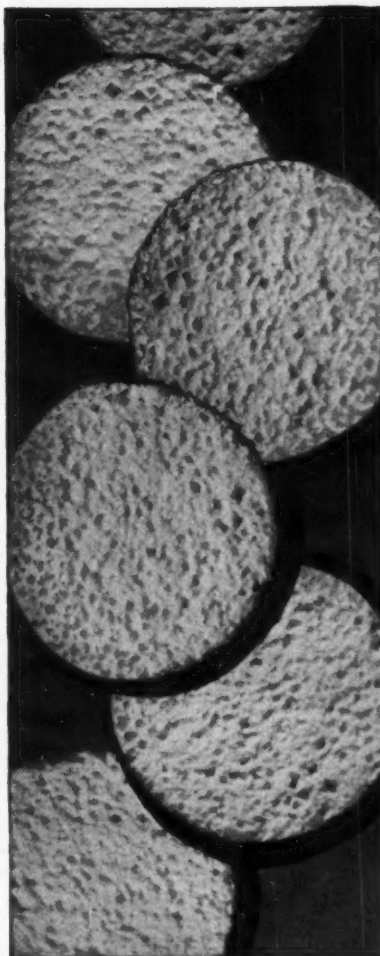
**A choice of materials, too.** Norton catalyst supports can be made from a variety of refractory materials, offering many different combinations of properties.

## *Test them in action*

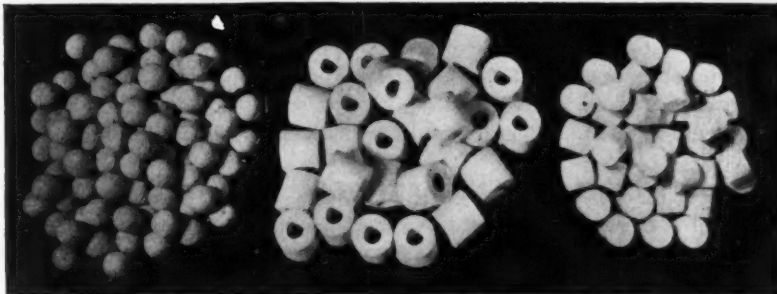
You can easily prove, in your own plant, what Norton catalyst supports can do towards improving your production. Want to see samples? Contact your Norton representative or write direct to Norton Company, 542 New Bond Street, Worcester 6, Mass. *Canadian Representative:* A. P. Green Fire Brick Co., Ltd., Toronto, Ont.

### **NORTON HEAT EXCHANGE PEBBLES**

also offer you worthwhile advantages, especially where alternating oxidizing and reducing atmospheres are met. They're made of ALUNDUM\* electrically fused alumina (alumina content 95% to 99%). Nothing like them for static or moving heat exchange beds.



Greatly enlarged views of cross-sections of the two types of Norton catalyst support spheres. *Left: Norton High-Porosity Spheres* have connected pores throughout. *Right: Norton Medium-Porosity Spheres* have pores close to surface. You can also get Norton Low-Porosity Spheres if required.



Norton catalyst supports are made in sphere, ring, and pellet form.

\*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

## **NORTON**

### *Special REFRACTORIES*

*Making better products to make other products better*

**NORTON COMPANY, WORCESTER 6, MASSACHUSETTS**



How Celite Mineral Fillers give a product delicate abrasiveness...



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TO PRODUCE A POLISH that is scratch-free—yet contains exceptional cleaning powers—most leading manufacturers of fine polishes use one of the Celite Mineral Fillers as a standard ingredient.

This use of Celite Fillers is based on

their delicate non-scratching abrasive action—a property that derives from their porous, thin-walled cellular structure. It is one of many unusual physical characteristics that adapt these diatomaceous silica powders to numerous industrial uses.

### THESE CELITE PROPERTIES BENEFIT MANY TYPES OF PRODUCTS

Because of their inertness and great bulk per unit of weight, Celite Mineral Fillers make ideal bulking agents for powders and pastes. Their tiny multi-shaped particles interlace to stiffen and strengthen admixtures. The microscopically small facets of these particles diffuse light so effectively that they can be utilized to impart any desired degree of flatness to a surface film. Their light, porous nature improves suspension, helps prevent segregation. And

their high absorption properties and unique diatom structure make them unusually effective as a means of overcoming caking in deliquescent materials.

If you are looking for the "extra something" to lift your product above competition—at a negligible cost—why not discuss your problem with a Johns-Manville Celite Engineer? For further information and samples, write Johns-Manville, Box 60, New York 16, N. Y.

### CHECK LIST OF PRODUCT BENEFITS OBTAINABLE AT LITTLE COST WITH CELITE MINERAL FILLERS

- Added Bulk
- Better Suspension
- Faster Cleaning Action
- Greater Absorption
- Improved Color
- Better Dielectric Properties
- More Durable Finish
- Increased Viscosity
- Elimination of Caking
- Higher Melting Point
- Better Dry Mixing
- Improved Dispersion



# Johns-Manville CELITE<sup>®</sup>

## MINERAL FILLERS

## BUSINESS &amp; INDUSTRY . . . . .



HERCULES EXPLOSION: Chemical industry's constant dread.

## Succor for Survivors

Optimists in the chemical industry, always hoping that plant disasters are a thing of the past, were jolted back to grim reality a few days ago when fire triggered an explosion at the Hercules Powder Co. dynamite plant near Pinole, Calif.

The blast came in the "dope house," where the dry ingredients for dynamite are mixed. Twelve men who were fighting the fire were killed by the explosion. Property damage: \$50,000.

The mixing operation is not usually considered hazardous and to the best of their knowledge, Hercules management believe there had never been a dope house explosion in the industry before. Consequently, employees tried to fight the fire, rather than evacuate the area.

Queried by **CHEMICAL WEEK**, Hercules said payments to the families of the 12 men will be about \$250,000. Compensation payments in accordance with California laws will amount to approximately \$100,000; other payments and burial expenses will hike the total to \$250,000.

Although most of the physical dam-

age in such disasters is usually covered by insurance, the compensation for lost lives is not such a straightforward matter. Hercules originally had plans for financial awards in the event of illness or injury, but found that state laws governed any awards made to workers for illness, injury or death.

**Insurance Not Enough:** Most of the large companies have group insurance plans, but under such agreements benefits are paid only for "non-occupational" accidents.

Monsanto works along these lines, maintains a policy to "be as liberal as necessary or desirable so that no undue financial hardship is suffered by the employees' families." For example, in the Texas City ammonium nitrate explosion, for the 154 who were either killed or missing, \$1,000 was paid to each widow or dependent; and under the group insurance plan, beneficiaries received \$6-8,000.

The insurance company handled the legal liability in this case. The company also appropriated funds for payment of all hospitalization and paid full wages during hospitalization and

convalescence.

Each state has a workmen's compensation law with individual variations. Eleven states have compensation laws that apply to hazardous employment whereunder partial disability and death claims are usually provided. Thirty-three states limit death compensation to payments over a period of time varying from 260-600 weeks. Oklahoma is the only state that pays no death benefits whatsoever.

In all compensation payments, two factors provide for the differences in the amount of financial retribution: the interpretation of the law and the waiting period. Neither factor is new. In most situations involving state or federal reimbursement, the inevitable red tape plays an important role from the point of view of the beneficiary.

In any event, the constant dread of accidents is still a macabre specter at the side of every chemical worker and Company official.

## Steady on Course

Although the U.S. Department of Justice is under new, Republican management, it's planning to steer approximately the same course that was charted by its former Democratic helmsmen on alien property affairs.

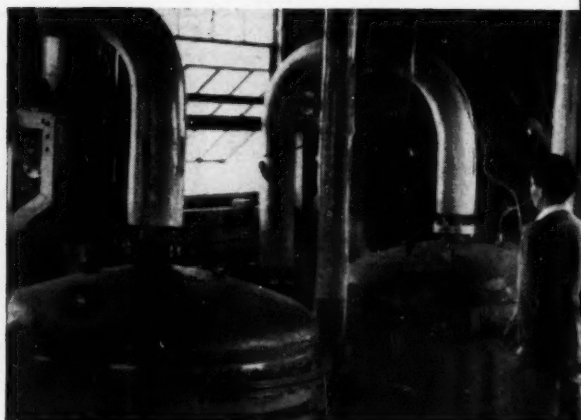
Specifically, Justice will continue to prosecute the civil suit against the now privately owned Schering Corp. (CW, Dec. 13, '52), and will hang on to General Aniline & Film until a current lawsuit is ended or until Congress changes the present law on alien property.

"There has been no change in attitude on the sale of seized firms," a Justice Department spokesman told CW. "Under the Trading With the Enemy Act, the government must retain its interest until all litigation has been adjudicated. GAF is the subject of a law suit in which a Swiss enterprise, Societe Internationale pour Participations Industrielles et Commerciales, claims to be the rightful owner."

In the Schering suit, the new policy makers in the Justice Dept. feel that they have to go ahead in the case because the company appears to have violated the terms of sale and its management has been defiant in its attitude toward the government and its purchase contract.



MONSANTO: Briefing from the American construction engineer.



MONSANTO: Operation in progress . . . smooth cooperation.



GOODRICH: . . . the whys and hows.

## U. S. Spurs

**L**IKE a child with his nose flattened eloquently against a candy case, masterminds of Japan's chemical industry can't make up their minds. On the one hand, they eagerly solicit technical assistance from U.S. firms. And on the other, although they expend great energy arguing the need of foreign capital investment, the Japanese in practice seem wary of actual commitments.

Proof of the value of American aid is immediately evident in Japan today. Riding high on a wave of rising production rates, the chemical industry's output has increased an attractive 34% since June, 1950, when the original investment law in Japan went into effect.

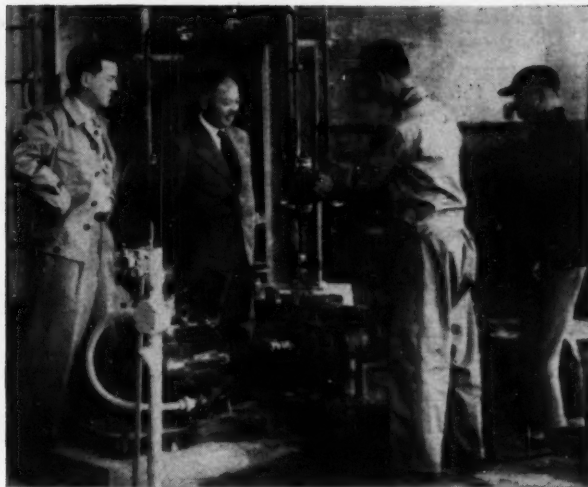
Yet there is a curious undercurrent of unease. Overproduction in some sections of the industry has driven smaller companies into bankruptcy, most particularly in textiles. Amalgamation and absorption by larger companies is an ever-spreading trend in Japan.

And while the Japanese, since 1947, have been openly promoting their country as an ideal repository for foreign capital and advanced industrial techniques, the cry has a hollow sound. More often than not, potential investors seem to run into a blank wall whenever there is any chance of foreign control of the particular company in question.

Still, the dilemma—the impossible choice—remains. Realizing the years they have wasted, and noting clearly the strides gained through American aid, Japanese industrialists see only



MONSANTO: . . . launching with traditional dedication ceremony.



GOODRICH . . . as the first plasticizer rolls.

## Japanese Chemical Industry

one quick and easy way to catch up with the fast-advancing level of modern technology. Only with American guidance can Japan manufacture chemicals which can compete in the world market.

**Joint Enterprise:** At present there are 26 cases of officially registered agreements involving American technical guidance in the Japanese chemical industry. Most representative and mutually profitable are five deals concerning the manufacture of synthetic fiber, and four dealing with the production of resin.

Financially-speaking, the 26 cases can be broken down into two categories. The first includes those new companies, set up jointly by American and Japanese firms, in which the U.S. contributes "invisible" assets—patents, general know-how, and technical procedures. As their stake, the Japanese supply all "visible" assets in the form of land, labor and building equipment. The American split: anywhere from 10-50% of the stock in the new companies.

Such ventures have, on the whole, proved mutually satisfactory. Typical are Japan Geon, Monsanto Kasei, Asahi-Dow, Japan Reichhold, and Ferro-Nippon.

• Japanese Geon Co., Ltd., was formed early in 1951 as the brainchild of B. F. Goodrich Chemical Co. and three large Japanese industrial firms\* in Kambara. Total capitalization: \$1,390,000; Goodrich's stock holding: 35%. Engineering and con-

struction work progressed smoothly, a large majority of the equipment was purchased in Japan, and any language difficulty was slight. Major snag found by Goodrich engineers was standardization of machinery—largely a matter of odd pipe sizes.

The first vinyl and vinylidene chloride began to roll last June with a monthly capacity of 250 tons. (Design permits future expansion to double present output rates.) And in addition to its stockholding, Goodrich contracted to receive royalties of 1.5% of total sales in the first year, 2% in the second, and 3% the third year and after. Management and staffing is solely in the hands of the three Japanese partners.

• In the case of Monsanto Kasei, the Monsanto Chemical Co. and Mitsubishi Kasei (Tokyo) are equal partners. They formed the company in the latter part of 1951 and officially launched operations in Jan. '52. Monsanto's cut of 51% of the stock was received in return for supplying all technical guidance in the manufacture of synthetic resin, polyvinyl chloride, and butyl benzyl phthalate.

The joint company is now running two plants, in Yokkaichi and Nagoya, with a plasticizer plant under construction. Production at Yokkaichi is close to 100 tons of primary products a month, with expansion to 200 tons/month anticipated in the near future. The Nagoya plant processes the products of the Yokkaichi plant and has a capacity of one million yards of polyvinyl chloride film a month.

Management is also jointly shared. The company's president is a Japanese sent from Mitsubishi, and its vice-president is an American representing Monsanto. Total capitalization: \$3,330,000.

• Japan Reichhold's total capitalization is less imposing—\$60,000. Ownership is divided into two shares; 55% is held by the Dai-Nihon Ink Mfg. Co., of Japan, 45% by Reichhold Chemicals, of the U.S.

A small pilot plant in Tokyo involved in the manufacture of various types of synthetic resins has been running for some time, and just recently a commercial-scale plant has been completed in the vicinity of Osaka, with full operations expected by April. At that time, Japan Reichhold will start paying the American parent company 3% of total sales.

The board of directors is binational, composed of three Japanese and two Americans.

• Asahi-Dow is the latest example of this type of agreement involving American technical help in Japan. It was set up jointly by Asahi Chemical Industry and Dow Chemical International last spring with a total capitalization of \$1,110,000. Each partner holds 50% of the stock outstanding.

Initial plans call for the construction of two plants to manufacture vinyl and vinylidene chloride under the trade name of Saran, one to be located in Nobeoka on the southernmost island of Kyushu, and the other at Suzuka, near Nagoya, due for completion by next June.

When rolling, the Nobeoka plant

\* Japan Light Metal, Furukawa Electrical Industry, and Yokahama Rubber.

will have an estimated monthly capacity of 150 tons, but will be expanded to produce 600 tons.

Management of Asahi-Dow is shared by the two parent companies, pays no royalties to Dow apart from dividends.

**Assistance Only:** The second category into which the 26 joint enterprises may be divided involves those cases of straight assistance-for-royalty agreements.

Among the most representative are those between Sumitomo Chemical and American Cyanamid Co.; between Mitsui Chemical and DeBell and Richardson Corp., and between Shin-etsu Chemical and International General Electric.

- American Cyanamid has extended assistance to Sumitomo in two separate bargains. One involves Sumitomo's new melamine resin plant now under construction in Osaka with a monthly capacity of 20 tons of resin. In return, American Cyanamid will receive royalty in terms of a certain percentage of total sales of the product.

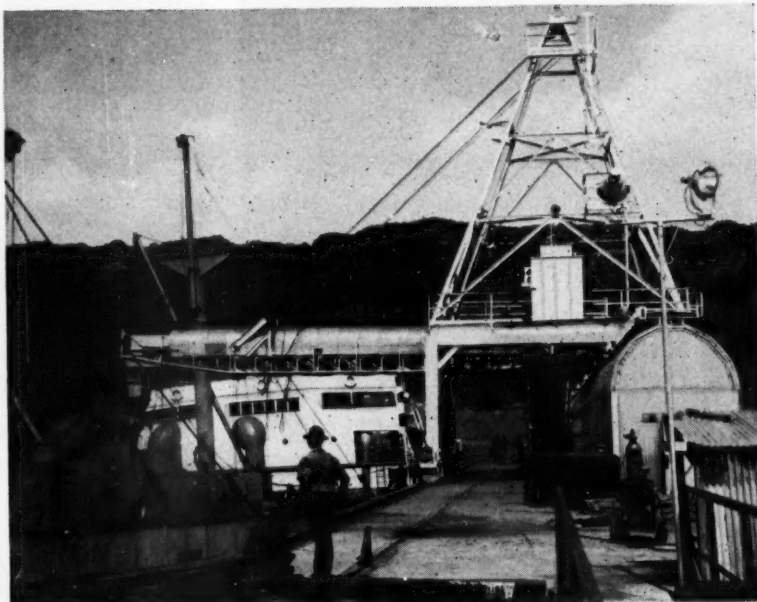
The other, under which the American concern is superintending designing and engineering of a urea plant at the Niihama Works on Shikoku Island, further includes patent rights in the manufacture of a methanol catalyst. Capacity production: 1,000 tons of urea per month.

- DeBell & Richardson Corp., Conn., has a five-year agreement with Mitsui Chemical to extend all necessary technical assistance involved in the manufacture of various plastics, excluding urea resin. For its aid, DeBell is to receive \$28,750 in five years. And in line with the general pattern, Mitsui has built a new plant in Nagoya with a monthly capacity of 200 tons of polyvinyl chloride.

- In the synthetic fiber industry, the largest single agreement of this type is the one between Du Pont and Toyo Rayon, under which Toyo Rayon recently acquired exclusive rights to manufacture and sell nylon products in Japan. It has two nylon plants in Nagoya with a monthly production capacity of 150 tons.

- Still more recently, International General Electric has concluded a contract with Shin-etsu Chemical in Tokyo concerning technical service in manufacturing silicone resins. In exchange, Shin-etsu is to pay a royalty of not less than \$5,000 a year for seven years.

Shin-etsu now has a small pilot plant running in Tokyo with a monthly capacity of three tons, and is planning to build soon a new plant cal-



## Bauxite Short-Cut

SIGNALING THE START of Kaiser Aluminum & Chemical Corp.'s \$12-million bauxite mining operations in the British West Indies is the SS *Evanthia*, loading up at Port Kaiser, Jamaica.

The christening ceremonies serve to point out Kaiser's gains:

- An annual bauxite production capacity of around two million tons.

- Sufficient reserves on the island to supply its expanded operations for an estimated 50 years.

- Reduction by 1,500 miles of the previous shipping distance from South American deposits to Kaiser's Baton Rouge, La., plant for processing.

culated to produce 30 tons of the silicone resins in the vicinity of Yokahama.

- Finally, a similar deal between Glidden of the U.S. and Ishihara Industry of Tokyo is up before the Foreign Investment Review Commission pending approval (*CW*, Jan. 24). Titanium dioxide is the product anticipated.

For the most part, all Americans having a finger in these deals feel that the Japanese chemical industry is making giant strides in overtaking world standards. Some, including Goodrich engineers, were even impressed by Japanese quickness of comprehension and tenacity. The Japanese have for decades been lauded as great copyists, but also "do very fine work on their own hook when they have to."

Japanese engineers themselves admit their own major weaknesses—lack of research facilities, few safety and automatic quality control devices. Other basic handicaps include limited natural resources, expensive hydroelectric power, and the fact that labor is more costly, not cheaper than in

the U.S.—in terms of productivity.

Despite these immediate problems, and bucking undercurrent resistance, the list of American companies spurring the Japanese chemical industry continues to grow. Official policy in Washington backs such investment to the limit, doing what it can to smooth out any difficulties that may arise with the Japanese government. Its only hesitancy comes when an American concern promotes an investment that requires remittance in hard currency profits or majority control. The question then arises as to whether such a deal would encourage a nationalistic political reaction in Japan.

Generally, however, U.S. stimulus of the Japanese chemical industry looks bright—particularly in view of the large potential market for chemicals in the Orient when and if Japan is given access to China's cheap raw materials.

## COMPANIES . . . . .

Major company purchases were in the news this week:

- International Glass Corp., Los Angeles, Calif., has purchased the

**BACK IN THE 1880's**  
**WHEN GRANT BECAME PRESIDENT**

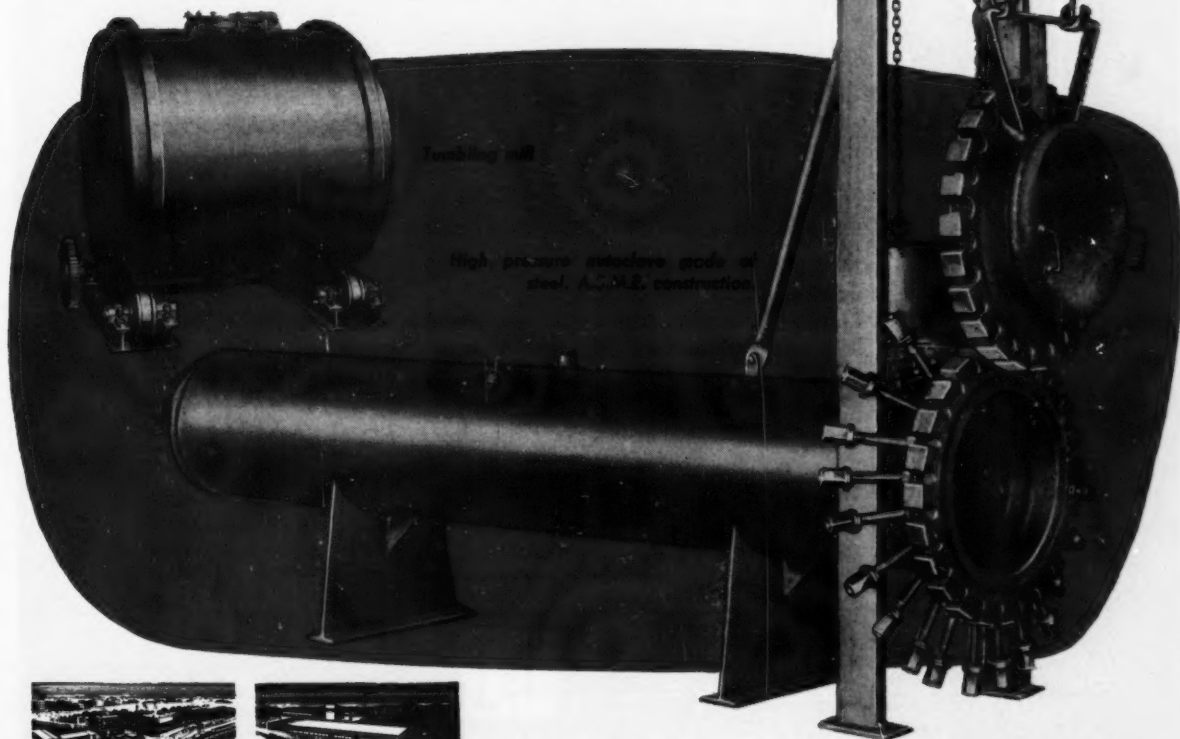


**Koven**

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Linked to the growth of America and its many history shaping events, KOVEN now boasts over 70 years of service to industry. It is this storehouse of skill and experience that enables us to create units which net today's manufacturers greatest profit. Let KOVEN show you how Individualized Equipment, tailored to fit your specific needs, can solve your most complex production problems—increase your output and lower your costs. Call or write for a consultation—no obligation.

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Plants: Jersey City, N. J.

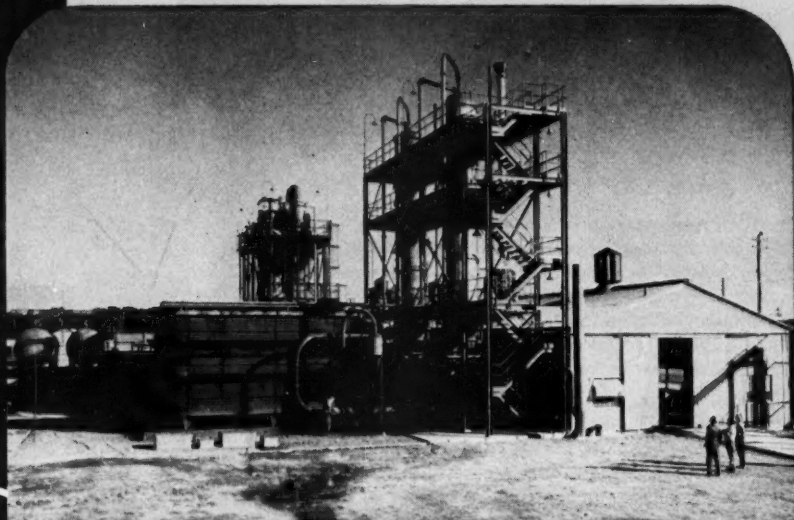


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These two nitric acid plants at Sterlington, La. were designed and built by C & I for Commercial Solvents Corp. Completed in 1952, the plants can produce a daily total volume of 120 tons of nitric acid, for use in the production of fertilizers.



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says COMMERCIAL SOLVENTS CORP.

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In recent years, over 90% of U. S. nitric acid plants have been built by C & I. With its vast experience in engineering, design, and construction, C & I delivers your nitric acid plant at a **FIXED COST . . . on a FIXED DATE.** Sizes range from 10 to 200 tons per day.

C & I is also prepared to build Neutralizer, Ammonium Nitrate and Complex Fertilizer plants.

*Specialists in the Processing*



*of Anhydrous Ammonia*

**THE CHEMICAL & INDUSTRIAL CORP.**

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## BUSINESS & INDUSTRY . . . . .

40,000-sq.-ft. plant and equipment of Perrault Glass Fiber Corp., Newport, Ark. The plant now manufactures inner pipe wrap for the oil industry, will be operated as a branch of International Glass, may be expanded to produce glass-based outer pipe wrap and roll roofing material.

- Barrett Co., Ltd., a subsidiary of the Barrett Division of Allied Chemical & Dye Corp., has bought the total assets of Louisville Pulp and Wallboard Manufacturing, Ltd., of Montreal. Purchase price is undisclosed.

- Continental Oil Co. has purchased the plant and manufacturing facilities of the Bryton Chemical Co., Trainer, Pa.

Conoco's Stepan Chemical Co. already operates a sulfonation plant in Chicago (CW, Feb. 21)—one of the

largest producers of industrial synthetic detergents in the midwest—and is completing expansion of facilities of its Baltimore (Md.) petrochemical plant to triple its output.

The Baltimore plant will supply raw materials for the newly purchased sulfonation plant at Trainer.

Sheffield Chemical Co. has been formed as a subsidiary of National Dairy Products Corp. with headquarters at Norwich, N.Y.

The action formalizes into a separate corporation the work carried on previously by the chemical division of Sheffield Farms, the Sealtest milk subsidiary which serves the metropolitan New York area.

Future diversification of products in the chemical and pharmaceutical industry is seen in the move.



**NO-KU KLUX KLANNER:** In hot places, chemical worker gets shielding from asbestos suit, provided by firm as per union contract.

## Quest for Glory

Figuring that "money isn't everything," and that their members must be alive and well to enjoy their higher wages, labor unions in the chemical processing industries are speaking out with bolder voice on the subject of health and safety provisions in bargaining contracts.

Recent developments indicate that the chemical labor unions not only want to improve physical working conditions for their members, but they also want to get the credit for such improvements. By pinning down this credit, a union can hope for enhanced prestige that will help keep present members satisfied, and at the same time can be utilized to help sell

workers at non-organized plants on the advantages of unionism.

**New Laws Urged:** Besides their continual hammering for more inclusive health and safety clauses in labor agreements, the unions also are advocating new laws that would require plant managements to conform to certain standard health and safety practices. Enactment of these laws, of course, would represent more glory for the unions.

Legislative goals as of now include:

- A Federal law for uniform health and safety standards in all plants producing goods for interstate and foreign commerce.

- Establishment of a Bureau of

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- ★ Higher Pigmented Plastisols
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- ★ Better Rubber Adhesives

Nopco's MODICOL® Series of agents is furnishing outstanding aids to: (1) manufacturers, in various fields, who need to obtain highly efficient dispersal of pigments into solvents; (2) coaters who wish to increase the solids contents of plastisols while keeping viscosities low; (3) rubber manufacturers who need to stabilize natural and neoprene latices in order to prevent chemical and mechanical instability, or solid-liquid unbalance. A Nopco MODICOL may prove the right answer to one of your production problems.

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Anything that when applied externally softens or relaxes the tissues, allays irritation, or soothes inflamed tissues.

### Example: GLYCERINE!

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If you're developing a new product that will contain an emollient, be sure to check Glycerine.

### New Calamine Lotion

For example, the American Pharmaceutical Association laboratory recently developed a new, improved Calamine lotion in which Glycerine is an important ingredient. The new lotion is said to overcome several disadvantages of older formulas. It pours easily from small dispensing bottles without clogging, spreads smoothly on the skin, and dries to a flexible film which doesn't rub off easily on fabrics.

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But Glycerine's emollient action is only a small part of the story. You can count on *versatile* Glycerine to serve as—

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Booklets on the application of Glycerine in the drug and cosmetic, food, protective coatings, and textile fields are available. For your copy, write Glycerine Producers' Association, 295 Madison Avenue, New York 17, N. Y.

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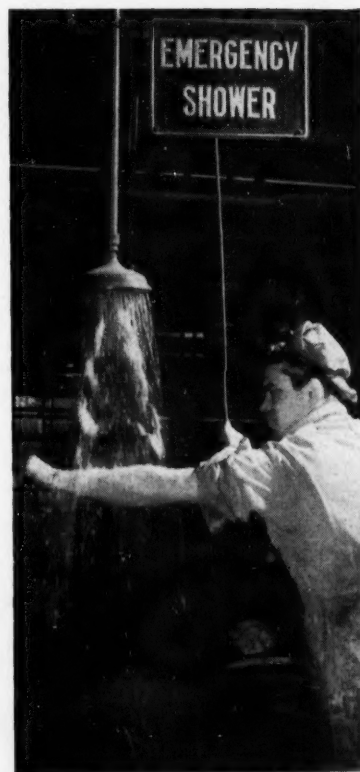
## BUSINESS & INDUSTRY . . . . .

Accident Prevention within the Department of Labor.

- A national workmen's compensation act, with uniform high standards of coverage and compensation.
- Federal assistance to state agencies administering labor laws.
- State laws for industrial health and safety codes, based on recommendations of the President's Conference on Industrial Safety, March, 1949.

**Already Sensitive:** Chemical labor unions are already in the vanguard of labor organizations in getting health and safety clauses into their contracts with companies. Out of 2,411 collective bargaining agreements recently analyzed by the Bureau of Labor Statistics, 51% enumerated safety provisions; but of the 72 chemical contracts in the group, 76% contained such clauses.

As examples of the chemical unions' increasing attention to this subject, one can point to last year's seven-month strike by the International Chemical Workers Union (AFL) at the Johns-Manville plant in Lompoc, Calif., mostly over health hazards; the statement to CHEMICAL WEEK by Chairman A. D. Lewis of the United Mine Workers' District 50 that his union "invariably" puts into its contracts with chemical firms "an effective and administratively workable provision" on safe equipment and health and safety; and the numerous new contract clauses themselves, such



**FLOODING OFF PHENOL:** "Company agrees to furnish first-aid facilities."

as the following:

"In those portions of the plant employing corrosive chemicals, safety showers, blankets, and counter solutions shall be provided in a conspicuous place and conspicuously labeled."

**Increasing Concern:** While general working conditions have always been within unions' province, none of the chemical unions' constitutions actually specifies health and safety among its objectives. Nearest approach is in the constitution of District 50's parent organization, the UMWA, which promises to work for "laws protecting the limbs, lives and health of our members."

Now the unions are going on record as doughtily as possible to make up for their former omissions. One of the resolutions adopted at last fall's ICWU convention declares that its members "have learned through hard experience that the goals of American labor are not limited to higher wages and better working conditions; that adequate protection requires a broader concern with the health and welfare of the trade unionist."

Sample of how one current chemical labor contract provides for health and safety vigilance on the part of the union:



**LUNGS' BEST FRIEND:** Some contracts insist that workers use safety aids.

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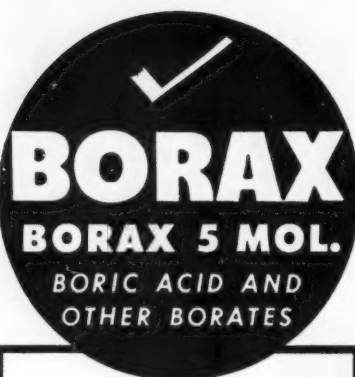
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## BUSINESS & INDUSTRY

"The collective bargaining committee (seven union members) shall have the authority to investigate all questions arising with regard to improper safety devices, unsanitary conditions, and other hazardous working conditions and shall be empowered to make recommendations to the company to alleviate such conditions. Proper records shall be made of safety suggestions together with records of disposition of such suggestions."

**Unworried Union:** Only union in the chemical and petrochemical field to show relative complacency in this matter is Oil Workers International Union (CIO). An OWIU spokesman told **CHEMICAL WEEK**:

"In general, safety conditions are very good in plants in which we bargain, particularly in view of the fact that both oil and chemical plants deal with highly dangerous substances." He said OWIU generally doesn't formalize safety terms into contracts because conditions are already satisfactory as a result of voluntary company action.

Some contracts stipulate that the union will encourage or require its members to comply with company safety rules, or that the union's shop stewards will help enforce those rules. Other contracts specify that each new employee must sign a safety pledge, and one chemical company hurriedly revised its job application blank recently to include the phrase, "I will accept medical treatment if injured in the course of work." This was prompted by the refusal of one injured worker to submit to treatment on the grounds that it would conflict with his religious belief.

**Prepaid Medicine:** One other way in which labor unions are plugging for the physical welfare of their members and their families is by publicizing various plans for prepaid medical insurance. Particularly enthusiastic about such proposals, which the American Medical Association condemns as "socialized medicine," are the United Gas, Coke & Chemical Workers (CIO).

Probably the most militant union action for health and safety gains last year was the long strike by ICWU local 146 at Lompoc. Although the company attitude was that the strike was settled on terms that had been offered in substantially the same form months earlier, ICWU called the settlement "a significant victory for the union."

"The main issue," according to ICWU, "was the union's demand for elimination of this health hazard [dust from diatomaceous earth]. A

new health and safety program has been instituted providing for regular six-month X-rays of all employees, and the company is committed to the immediate installation of dust abatement equipment designed to reduce the toxic dangers. The company also has agreed to the formation of a joint union-management health and safety committee."

With chemical unions eager to get credit for looking out for workers' health and safety, some companies may be able to use that eagerness as a lever to pry unions away from unreasonable positions during contract negotiations. A union bargaining committee might be induced to moderate its demands if it could have the distinction of winning new safety and health safeguards for its members.

## EXPANSION . . . .

**Nylon:** The American Enka Corp. will start construction immediately on a \$2 million nylon plant adjacent to its rayon plant at Enka, N.C.

Initial production of staple nylon textile fiber annually will be about two million lbs. Later, facilities will be added to provide for production of filament type yarn as well.

Enka is the second firm to be licensed under Du Pont patents as an independent producer of nylon.

**Aluminum:** Harvey Machine Co., Inc., Torrance, Calif., will construct the first rolling mill on the Pacific Coast for the production of aluminum sheets, strips and circular shapes.

Erection of a new plant, estimated to cost \$20 million, will begin as soon as a site has been selected.

The new mill is part of the expansion goal set by DPA to increase facilities for the production and heat treatment of aluminum.

**Alumina:** Reynolds Metals Co. expects to start testing operations in about 60 days at its \$42-million La Quinta alumina plant on Corpus Christi Bay, Texas.

The plant will probably be turning out its first commercial amounts of alumina early in June. Capacity production: 1,000 tons of alumina daily.

**Explosives:** Fluor Corp., Ltd., Los Angeles, has been awarded a contract by the AEC for design and engineering of a \$29-million explosives processing and assembly plant near Macomb, Ill.

Construction of the project, to be called the Spoon River Plant, will start early this spring on 9,800 acres of government-owned land, the site

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Volumes gas (0°C., 1 atm.) per volume DMF at 25° C. and gas partial pressure of one atmosphere unless otherwise stated.

GAS	VOL./VOL.
Hydrogen Cyanide	>3,000 (30°C.)
Hydrogen Bromide	680 (0°C.)
Hydrogen Chloride	590
Sulphur Dioxide	405
Chlorine	385 (0°C.)
Boron Fluoride	385 (0°C.)
Diacetylene	145 (100 mm)
Butadiene-1, 3	61
Hydrogen Sulfide	35
Vinyl Acetylene	35 (100 mm)
Acetylene	31
Ammonia	31
Butene-1	22
Propylene	8.2
Methyl Acetylene	8.0 (100 mm)
Carbon Dioxide	4.4
Acetylene	4.2 (100 mm)
Propane	4.0
Ethane	1.5
Ethylene	1.3
Methane	0.3
Oxygen	0.1
Carbon monoxide	0.06
Hydrogen	0.04
Nitrogen	0.04

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As a gas solvent, Du Pont DMF (Dimethyl Formamide) offers outstanding solvent power plus high selectivity. This highly polar functional member of the series of dialkyl substituted amides has the following properties:

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Vapor Pressure, 25°C ..... 3.7 mm.  
Viscosity 25°C ..... 0.802 cp.  
Flash Point T.O.C. .... 153°F  
Solubility ..... Miscible with water and most common organic solvents

**DMF as a Reaction Medium.** Through the capacity to hold large quantities of gas in solution and rapidity of solvent action on the reactants involved, DMF serves as an inert medium to increase product yields, accelerate reaction rates and to lower by-product formation.

**DMF for Gas Recovery.** The properties of DMF suggest its use for recovery of acetylene, butadiene and acid gases. For example, economical recovery of high purity acetylene from the pyrolysis of hydrocarbons is now possible with a DMF solvent recovery system.

**DMF as a Carrier Solvent.** DMF provides a means of carrying or storing anhydrous gases which are not readily liquefied and are hazardous to handle. The conveniently handled solid boron fluoride-DMF complex used as a polymerization catalyst is an example of how DMF can extend the usefulness of such gases.

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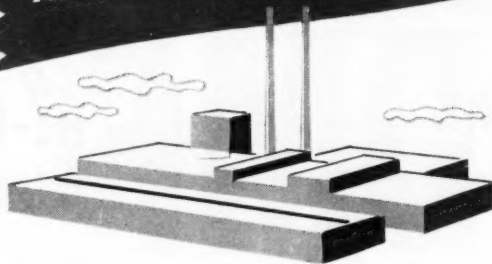
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B & I . . . . .

of Camp Ellis during World War II.

Most of the construction work will be on a lump-sum competitive bid basis, and approximately 2,000 construction workers will be required late this year.

The plant will be operated by a private contractor not yet selected, and is scheduled to start rolling in mid-1954.



PFIZER "FLYERS": Rendezvous in Rio.

## Antibiotics in Brazil

In line with its policy of "seeking long-range stability through the establishment of direct sales organizations," Pfizer & Co., Inc. has set up within the past 18 months seven wholly-owned foreign trade subsidiaries. One such, a packaging and production plant, is being constructed in Sao Paulo, Brazil, with production slated sometime within the next few months.

Called into conference in Rio this week (present headquarters of Pfizer in Brazil) to spearhead plans, were Donald Hilton, director general of Pfizer Inter-American S. A.; Robert Yingst, head of the new production plant in Sao Paulo; and Charles Warner, a specialist in antibiotics.

As part of its expansion, Pfizer has taken over part of the old Squibb plant to initiate packaging of antibiotics, and eventually, it is hoped, to get into basic manufacture of pharmaceuticals and chemicals.

At present, Brazilian earnings amount to approximately 1¢ per share to Pfizer stockholders and are frozen. Executives anticipate, however, that the venture will prove worthwhile in the not-too-distant future, when lightened tariff barriers, imposed by the Brazilian government in an attempt

## Solvents

acetone  
n-butyl acetate  
ethyl acetate  
2-ethylbutyl alcohol  
2-ethylhexyl alcohol  
isobutyl acetate  
isobutyl alcohol  
isopropyl acetate  
3-methoxybutyl acetate  
3-methoxybutyl alcohol

## Plasticizers

dibutyl phthalate  
diethyl phthalate  
di-(2-ethylbutyl) phthalate  
di-(2-ethylhexyl) phthalate (DOP)  
di-(methoxyethyl) phthalate  
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di-2-ethylhexyl adipate  
di-isobutyl phthalate

## Anti-Skinning Agents

Tecquinal  
mono-tert-butyl-hydroquinone  
Tenamene 20

## Film Bases

cellulose acetate  
cellulose acetate butyrate



## For the paint, varnish and lacquer industry

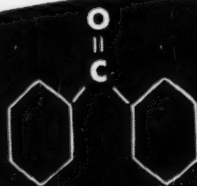
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# benzophenone

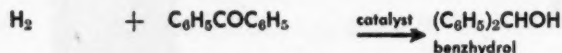
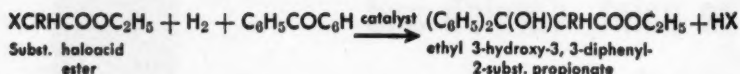
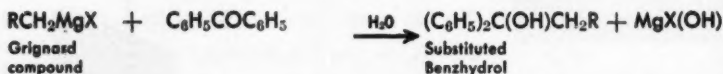


**BENZOPHENONE** (diphenyl ketone) is an intriguing intermediate with an active carbonyl group connecting two phenyl groups. Its use in perfumes is well known, but its potential in synthesis may still be exploited. It has been suggested as an intermediate for certain antihistaminics, hypnotics and other pharmaceuticals; insecticides; dielectric media; and as a gas absorbing medium.

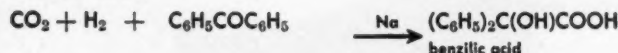
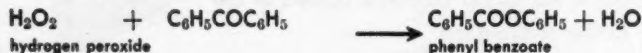
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<b>melting point</b>	● 46.5° — 48.5° C.
<b>molten color</b>	● below 100 Hazen Scale
<b>odor</b>	● characteristic (rose-geranium type)

## Typical reactions of BENZOPHENONE



In the reduction, other products may be obtained by varying the conditions.



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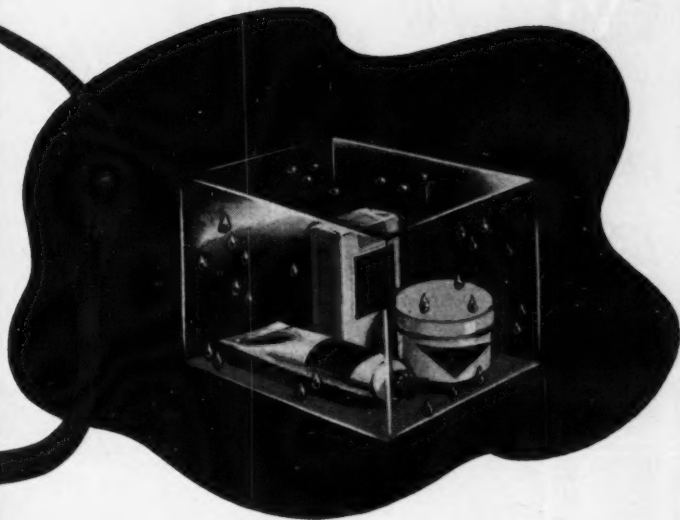
## LEGAL . . . . .

**Live Witnesses:** As many as 50 defense witnesses, including Pierre S. du Pont and Irene du Pont, may be called to the stand in Chicago's Federal District Court as the antitrust case against Du Pont, General Motors and U.S. Rubber Co. resumes this week. In contrast to the government's presentation of evidence, which took only 12 days and which consisted mostly of 1,000 or more documents, the defense is expected to take several months to make its case and to rely primarily on live witnesses. Last week, the Justice Department won a minor victory when Judge Walter J. La Buy ruled that 36 of the individual defendants would be dropped from the suit "without prejudice"—meaning that proceedings against them can be renewed at any time in the future. This left 33 members of the du Pont family still listed as defendants. When the trial began last November, there were 118 individual defendants.

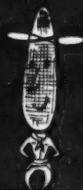
**Levy Can't Be Ducked:** Regardless of what the courts do to the Texas state tax on gathering of natural gas, it appears that chemical companies and other big consumers of natural gas still will have to pay—indirectly—some kind of a levy on that product. While pipeline companies have declared that they'll carry their fight against the gas gathering tax to the U.S. Supreme Court if necessary, leaders in the state legislature are making it clear that "unless the gas companies accept the appeals court's decision as final, we have no alternative but to raise the needed revenue from other bills now pending." In denying the gas companies' contention that the tax was a burden on interstate commerce, Associate Justice Robert G. Hughes commented, "all that truthfully can be said of the statute is that it increases the cost of gas to the consuming public. There are few if any taxes that do not have a similar effect. This, however, is not a defect."

**French Names Barred:** Use of French names on cosmetic products made in the United States has stirred the Federal Trade Commission to issue a cease and desist order to Argentum Laboratories, Philadelphia. FTC rules that it's misleading to print on the label "Feuille de Violette" and "Greetings from Paris" or a picture of the Eiffel Tower when the product was compounded in the U.S. Also, FTC's

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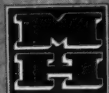
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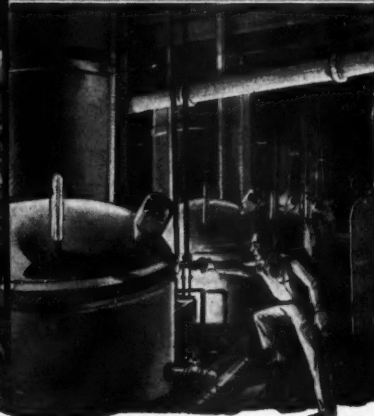
**Q.** *How to most effectively reduce aldehydes and ketones?*



**A.** *Use*



**Sodium Borohydride!**



#### SODIUM BOROHYDRIDE . . .

reactions may be carried out in the presence of aqueous, alcohol or amine solutions.

#### SODIUM BOROHYDRIDE . . .

reductions of aldehydes and ketones in the presence of other reducible groups accomplished without effect on the other groups.

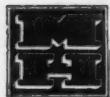
#### SODIUM BOROHYDRIDE . . .

reductions provide good yields at room temperatures with rapid reactions.

This reagent does away with the necessity of expensive high pressure, high temperature equipment.

Acid halides may also be reduced with Sodium Borohydride, but generally it does not reduce olefinic double bonds, nitriles, alkyl or aryl halides.

For more complete details write:



# METAL HYDRIDES

22 CONGRESS STREET • BEVERLY • MASS.

#### B & I . . . . .

order forbids Argentum to advertise that its products contain gold, unless the gold content is "substantial." FTC said the company had billed a perfume as containing "Pure 24-Karat Gold," when the gold content was "less than the lowest concentration of gold found in sea water."

**Steel Drum Pricing:** Still another businessman who is wrathful at FTC is John Hauerwaas, president of United States Steel Products Division, whose company is accused by FTC of violating the fair trade act in its method of pricing steel drums, many of which are used by chemical companies. "The timing of the complaint," Hauerwaas declares, "would alone warrant the inference that it is another unjustified attack on business influenced by the same old ideology that has marked the policies of the Commission for so many years."

**Potency Claim Upheld:** Chapman Chemical Co., Memphis, Tenn., won a face-saving jury verdict in circuit court in Montgomery, Ala., although the cash settlement amounted to only about \$580. A Chapman customer, Glynn Jones Co., of Montgomery, was balky in paying for a shipment of termite killer sold by Chapman, contending that the preparation didn't work. The Chapman lawyer successfully argued that the product would have killed termites if it had been used according to directions.

#### FOREIGN . . . . .

**Oil/Turkey:** Turkey's first major oil refinery will be built by the Ralph M. Parsons Co., Los Angeles engineering and construction firm, at a cost of approximately \$8 million.

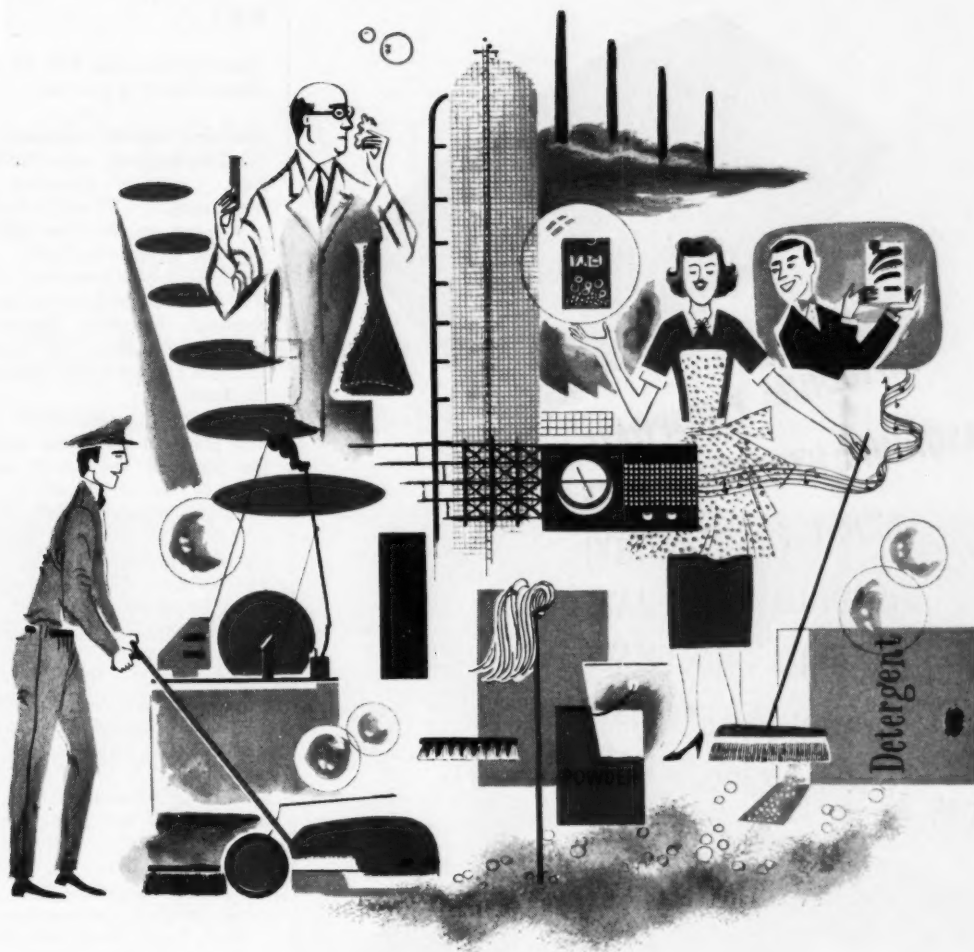
Design and engineering will start immediately in the firm's Los Angeles office, and construction will probably begin by next summer. Completion is scheduled for late 1954.

Location: Batman, 60 miles east of Diyarbakir; materials: to be purchased both in the United States and Europe.

**Paint/Canada:** Directors of Canada Varnish Co. have proposed to shareholders that the company sell the assets of the 29-year-old all-Canada paint and varnish firm and enter a new line of business. Sales price tag: \$375,000.

The plan calls for Canada Varnish to hold \$700,000 in cash and other liquid assets for the acquisition of another business.

Reason for move: unaudited figures for 1952 show the company to be



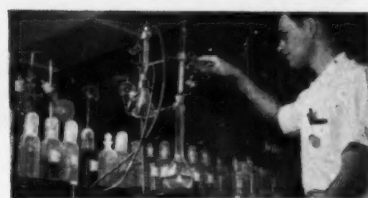
## PUTTING THE PROFIT IN CLEANING



**CLEANING DISHES** and household items takes hundreds of millions of pounds of detergents annually. Here Monsanto phosphates increase sales power by increasing cleansing power.



**CLEANING DIESEL** locomotives and other heavy industrial equipment is big business. Here Monsanto phosphates increase cleansing effectiveness, lower maintenance costs.



**SEARCHING OUT SECRETS** of cleansing and its fundamentals is one of the most important aims of several well-equipped, well-staffed Monsanto laboratories.

### Monsanto Phosphates Help Industry Clean Up

The well-scrubbed look home and industry are sporting these days is no accident. It's part and parcel of the tremendous impetus given cleaning by the development of new detergents over the last decade.

Aiding manufacturers in the development of better cleaning compounds is the tremendous number of products made by Monsanto's Phosphate Division. Sodium tripolyphosphate, tetrasodium pyrophosphate, trisodium phosphate, monosodium phosphate and literally

dozens of other important products are used today by all major manufacturers to improve detergent effectiveness.

To find out more on how Monsanto—with one of the broadest lines of phosphates in the country—can help *your* business, write today to MONSANTO CHEMICAL COMPANY, 1700 South Second Street, St. Louis 4, Missouri.

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle, Twin Cities. In Canada, Monsanto Canada Ltd., Montreal.



SERVING INDUSTRY...WHICH SERVES MANKIND

**TRISODIUM PHOSPHATE**  
**TETRASODIUM PYROPHOSPHATE**  
**ARM-O-FOS (TRIPOLY)**  
**DISODIUM PHOSPHATE**  
**MONOSODIUM PHOSPHATE**  
**DRI-TRI (ANHYD. TSP)**  
**SODIUM ACID PYROPHOSPHATE**



Uniformly dependable quality that you and your customers can depend upon is assured by the A. R. MAAS Chemical Company label. Know more about MAAS Chemicals—write today for informative literature concerning your problems.



**A. R. MAAS CHEMICAL CO.**  
 Division of Victor Chemical Works  
 4570 Ardine Street, South Gate, California



## B & I . . . . .

operating at a loss with no immediate improvement in prospect.

**Chemical Exports/Germany:** In 1951, Western Germany exported to Middle East countries chemical products amounting to 2.5% of its total exports.

Figures for the first half of 1952 show an increase to 3.4%.

Of the Arabic countries, only Egypt is of major importance to the German chemical industry. Egypt receives more than half of all West-German nitrogen exports to the Near and Middle East.

Iran, on the other hand offers the best prospect for future markets. On the basis of the annex agreement, June 3, '52, it offered to purchase from the Bundesrepublik during the period June 1, '52 to May 31, '53, chemical products in the amount of \$10 million. And theoretically, this figure could be quadrupled as long as German imports from Iran do not run into a snag.

**Oil/Brazil:** Pacific Vegetable Oil Corp., San Francisco, is exploring the possibility of expanding the production of oil for edible and industrial uses from Babassu kernels found in the forests of Northern Brazil.

Main difficulty: perfecting a machine designed to crack the nuts, and separating the kernels from the shell mechanically to recover the oil.

Now, Pacific Vegetable has put its first experimental nut-cracking and oil extraction plant in operation in the Amazon River area.

## KEY CHANGES . . .

**Edward H. Little:** To chairman of the board, Colgate-Palmolive-Peet Co., Jersey City, N.J.

**H. D. Hughes:** To general sales manager, Industrial Chemicals Division, Carbide and Carbon Chemicals Co., New York, N.Y.

**Jackson V. Vernon:** To vice-president, Food Machinery and Chemical Corp., San Jose, Calif.

**James A. Reilly:** To board of directors, Colgate-Palmolive-Peet Co., Jersey City, N.J.

**E. D. Powers:** To president, Chemical Construction Corp., New York, N.Y.

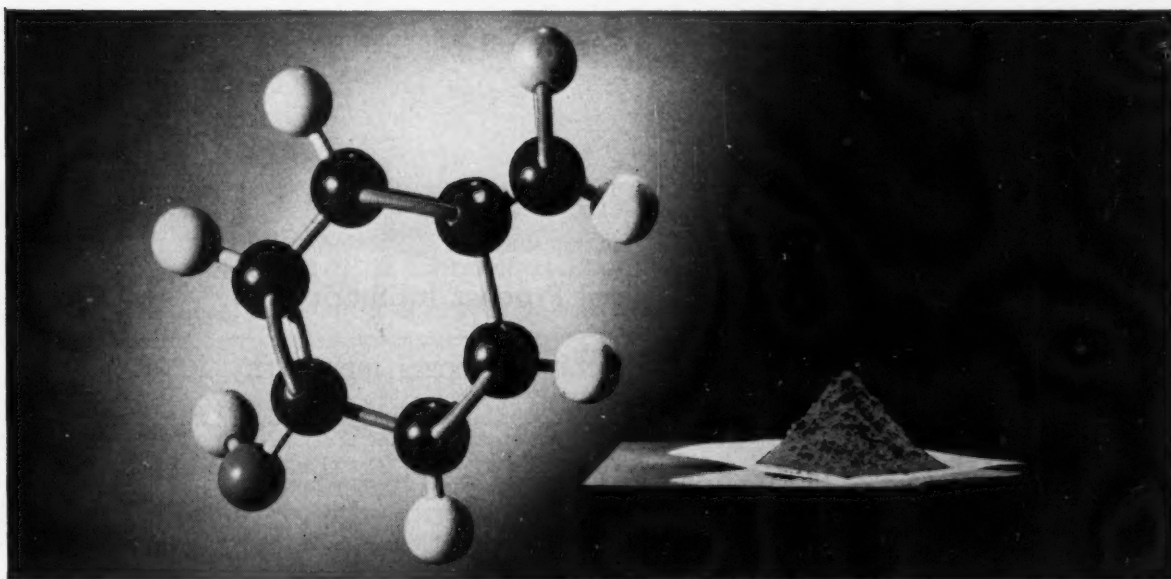
**Walter A. Naumer:** To president, Pyrofax Gas Co., division of Union Carbide and Carbon Corp., New York, N.Y.

**Robert W. Pelz:** To assistant to director of research, Ferro Corp., Cleveland, O.



# p-HYDROXYBENZALDEHYDE

Product of DOW RESEARCH proves valuable  
as an intermediate for pharmaceutical and perfume  
manufacture . . . available in commercial quantities



## properties

Pink powder with a faint, pleasant odor  
Melting point . . . . . 116.5°C.

## solubility (approximate)

(grams per 100 grams solvent, at 25°C.)

Acetone . . . . .	83	Ether . . . . .	12
Benzene . . . . .	0.4	n-Heptane . . . . .	<0.1
Carbon tetrachloride . . . . .	<0.1	Methanol . . . . .	116
		Water . . . . .	1.0

THE DOW CHEMICAL COMPANY  
Dept. FC 3-2, Midland, Michigan  
Send an experimental sample of  
p-Hydroxybenzaldehyde.

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Excellent use is made of p-Hydroxybenzaldehyde in producing anisaldehyde and many other fine chemicals for the pharmaceutical and perfume industries.

Production of fine chemicals of uniform high quality must necessarily demand that intermediates also be of uniform high quality—an assured characteristic of Dow p-Hydroxybenzaldehyde.

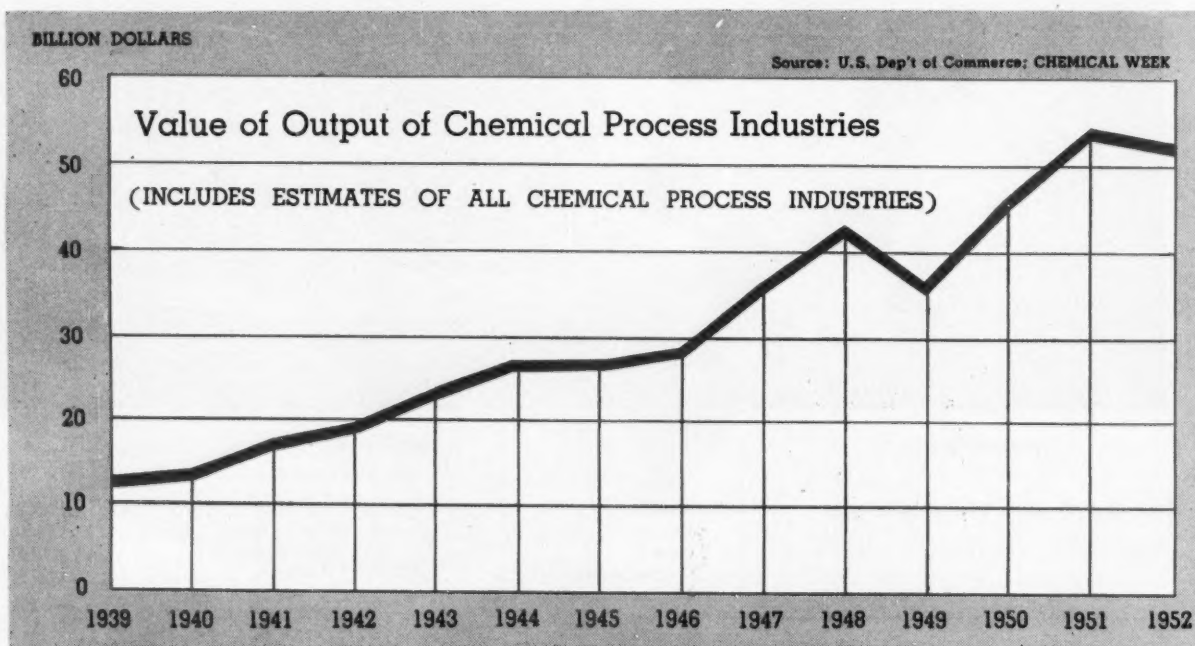
You can rely on Dow for dependable supply of this chemical, and for complete information or technical assistance in its use. Simply address your inquiry to Fine Chemical Sales, THE DOW CHEMICAL COMPANY, Midland, Michigan.

you can depend on DOW CHEMICALS





## Record of a Record Breaker



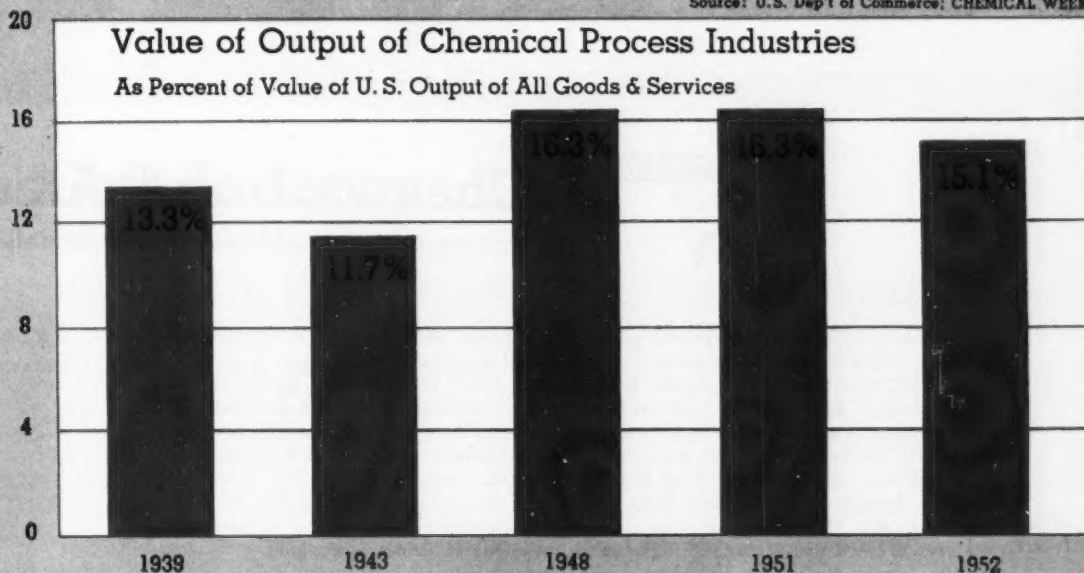
**T**HE FELLOW who first said the only things you can't escape are death and taxes was only partially right. If you're doing business today, you can't avoid mountains of statistics.

This is particularly true in fast-moving fields like the chemical process industries where today's business facts may be tomorrow's history. But while current statistics are necessary to the sound conduct of business, they are more reliable guides to action when viewed in the light of what has happened. For though the future will grow out of what exists today, the present has its roots in the past. Good statistics enable one to look back to the past to see where the present may be leading.

That's why CHEMICAL WEEK, in conjunction with the McGraw-Hill Department of Economics, has compiled the accompanying statistical review of the chemical process industries. In the following pages are tabulated all the statistics of value to various phases of management that are available from agencies of the government and other public and private sources having reason to collect such data.

PERCENT

Source: U.S. Dep't of Commerce; CHEMICAL WEEK



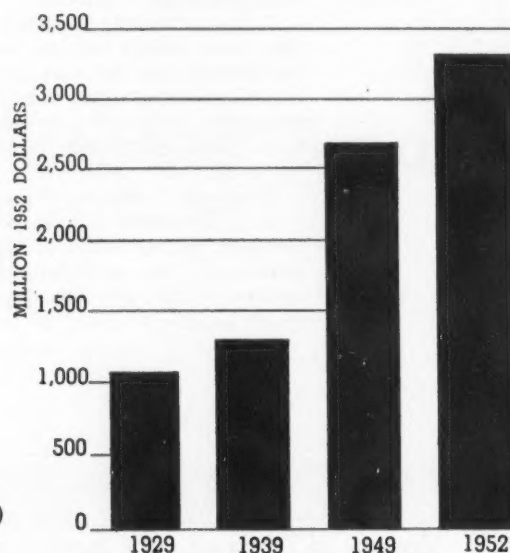
**B**ECAUSE the principal purpose of this review is to develop a business tool which will have an almost infinite number of uses, no attempt has been made here to analyze these data in great detail. But some definite trends stand out even from casual observation. The most obvious, graphed on the opposite page, is the tremendous surge in output during the last couple of years, capping a rapid—and uninterrupted, but for one dip—expansion that began just before World War II.

Much of this expanded production parallels the general growth of all manufacturing. In the graph above, however, it is clear that the chemical process industries have been more pace-setters than followers. For their contribution

	Contribution to National Income	Wage and Salary Bill	Wages and Salaries Adjusted for Price Changes
	Million \$	Million \$	Million 1952 \$
1929	\$1,136	\$664	\$1,029
1930	1,035	621	987
1931	827	529	925
1932	557	413	804
1933	690	421	864
1934	725	495	982
1935	810	525	1,015
1936	959	572	1,096
1937	1,165	672	1,242
1938	1,005	621	1,169
1939	1,205	667	1,275
1940	1,489	808	1,530
1941	1,941	1,098	1,982
1942	2,761	1,662	2,707
1943	3,355	2,026	3,112
1944	3,399	2,060	3,112
1945	3,250	2,072	3,061
1946	3,337	1,949	2,652
1947	3,846	2,255	2,685
1948	4,383	2,450	2,707
1949	4,627	2,429	2,711
1950	5,341	2,657	2,936
1951	6,601	3,176	3,251
1952	6,860 (est)	3,325 (est)	3,325 (est)

## REAL WAGES &amp; SALARIES

More than Tripled Since 1929



C W Report



## Chemical and Allied

(Includes Industrial Chemicals, Drugs and Medicines.)

to the country's total output of goods and services bulks larger, percentage-wise, today than at the beginning of this period of recent growth.

This record-breaking growth that has led many to call these times the "Chemical Age" has not been confined to any one segment of the chemical process industries. In the following pages are statistics for the Chemical and Allied Products; Petroleum and Coal Products; Rubber and Rubber Products; Plastics; Synthetic Fibers; Soap and Synthetic Detergents; Fertilizer; Vegetable and Animal Oils and Fats; Pulp, Paper and Paperboard Mills; Paint; and Drugs and Medicines industries. These fields individually reflect the decided growth trend that is true of the chemical processing industries as a whole.

**I**N EACH field, there has generally been an increase in:

- Real wages and salaries paid out.
- Corporate sales.
- Pretax profits.
- Capital expenditures and capital investment per worker.

But a less happy aspect of the charted statistics is the tremendous tax burden the chemical process industries are now carrying. This tax bite was particularly deep over the last two years when the industries expanded at an extremely rapid rate to meet defense needs, and paid high excess profits taxes—figured on a pre-expansion volume of business basis—on earnings from this new capacity.

Other developments that jut out:

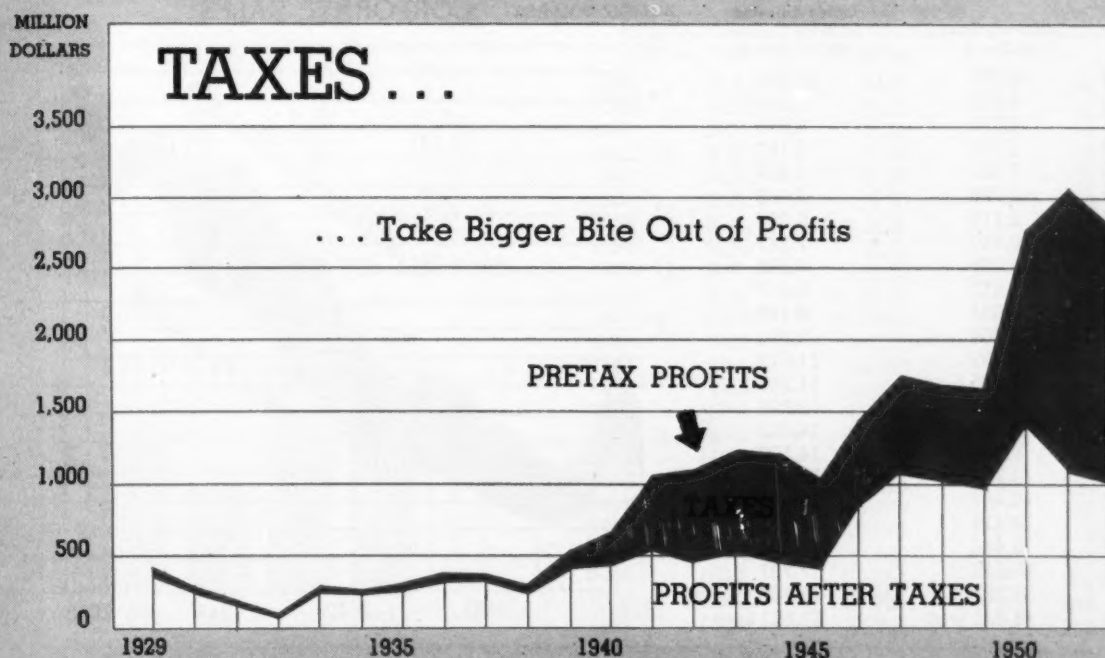
- The growth of synthetic rubber, since its "statistical birth" in 1941, at the expense of natural.
- Similar inroads made by synthetic detergents into soap's domain.
- The tremendous spurts of synthetic fibers, plastics, drugs and fertilizers.

	Pretax Profits	Pretax Profits Adjusted for Price Changes	Taxes	Percent of Pretax Profits	Profits After Taxes	Profits After Taxes Adjusted for Price Changes	Profits After Taxes as Percent of Pretax Profits
	Million \$	Million 1952 \$	Million \$		Million \$	Millions 1952 \$	
1929	\$ 430	\$ 667	\$ 54	12.6%	\$ 376	\$ 583	87.3%
1930	284	452	42	14.8	242	385	85.2
1931	188	329	31	16.5	157	274	83.5
1932	98	191	23	23.5	75	146	76.5
1933	294	604	37	12.6	257	528	87.4
1934	280	556	47	16.8	233	462	83.2
1935	305	590	53	17.4	252	487	82.6
1936	397	761	77	19.4	320	613	80.6
1937	391	723	76	19.4	315	582	80.6
1938	300	565	63	21.0	237	446	79.0
1939	519	992	103	19.8	416	795	80.2
1940	650	1,231	207	31.8	443	839	68.2
1941	1,041	1,879	514	49.4	527	951	50.6
1942	1,080	1,759	612	56.7	468	762	43.3
1943	1,220	1,874	717	58.8	503	773	41.2
1944	1,194	1,804	725	60.7	469	708	39.3
1945	1,024	1,513	608	59.4	416	614	40.6
1946	1,474	2,005	586	39.8	888	1,208	60.2
1947	1,776	2,114	707	39.8	1,069	1,273	60.2
1948	1,696	1,874	677	39.9	1,019	1,126	60.1
1949	1,665	1,858	673	40.4	992	1,107	59.6
1950	2,778	3,070	1,353	48.7	1,425	1,575	51.3
1951	3,070	3,142	1,972	64.2	1,098	1,124	35.8
1952	2,800 (est)	2,800 (est)	1,800 (est)	64.3 (est)	1,000 (est)	1,000 (est)	35.7 (est)

## Products Industry

(Paints, Fertilizers, Oils and Fats)

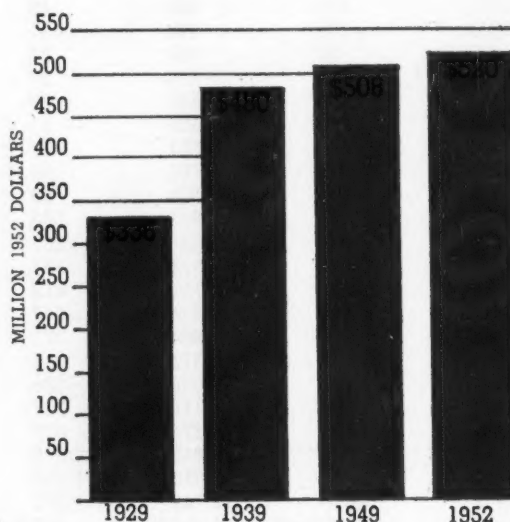
Source: U.S. Dep't of Commerce; CHEMICAL WEEK



	Dividends Paid Out	Dividend Adjusted for Price Changes	Dividends as Percent of Profits After Taxes
	Million \$	Million 1952 \$	
1929	\$217	\$336	57.7%
1930	269	428	111.1
1931	196	343	124.8
1932	169	329	225.3
1933	174	357	67.7
1934	156	310	67.0
1935	264	511	104.8
1936	249	477	77.8
1937	257	475	81.6
1938	172	324	72.6
1939	251	480	60.3
1940	254	481	57.3
1941	260	469	49.3
1942	237	386	50.6
1943	262	402	52.1
1944	271	409	57.8
1945	298	440	71.6
1946	360	490	40.5
1947	401	477	37.5
1948	400	442	39.3
1949	455	508	45.9
1950	592	654	41.5
1951	516	528	47.0
1952	520 (est)	520 (est)	52.0 (est)

## REAL DIVIDENDS

(ADJUSTED FOR PRICE CHANGES)



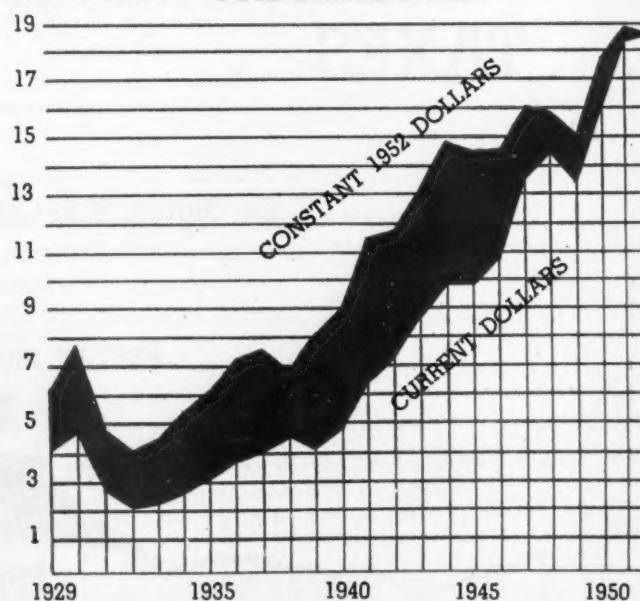
C W Report

## Chemical and Allied

SOURCE: U. S. Dep't of Commerce; CHEMICAL WEEK

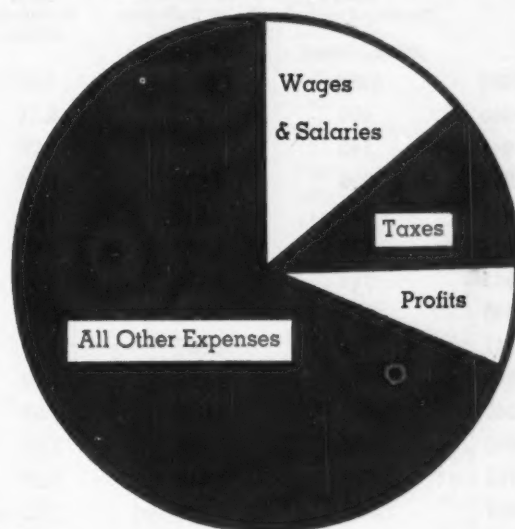
	Corporate Sales Million \$	Corporate Sales Adjusted for Price Changes Million 1952 \$
1929	\$4,025	\$6,240
1930	4,878	7,755
1931	2,770	4,843
1932	2,170	4,163
1933	2,251	4,622
1934	2,726	5,409
1935	3,119	6,033
1936	3,783	7,247
1937	4,088	7,556
1938	3,657	6,887
1939	4,251	8,128
1940	4,764	9,023
1941	6,437	11,619
1942	7,205	11,735
1943	8,612	13,229
1944	9,822	14,837
1945	9,834	14,526
1946	10,737	14,608
1947	13,487	16,055
1948	14,413	15,925
1949	13,444	15,004
1950	16,052	17,737
1951	18,331	18,762
1952	18,625 (est)	18,625 (est)

## BILLION DOLLARS CORPORATE SALES



	Wages and Salaries as Percent of Sales	Taxes as Percent of Sales	Profits After Taxes as Percent of Sales	Dividends as Percent of Sales
1929	16.5%	1.3%	9.3%	5.3%
1930	12.7	0.9	5.0	5.5
1931	19.1	1.1	5.7	7.1
1932	19.0	1.1	3.5	7.8
1933	18.7	1.6	11.4	7.7
1934	18.2	1.7	8.5	5.7
1935	16.8	1.7	8.1	8.5
1936	15.1	2.0	8.5	6.6
1937	16.4	1.9	7.7	6.3
1938	17.0	1.7	6.5	4.7
1939	15.7	2.4	9.8	5.9
1940	17.0	4.3	9.3	5.3
1941	17.1	8.0	8.2	4.0
1942	23.1	8.5	6.5	3.3
1943	23.5	8.3	5.8	3.0
1944	21.0	7.4	4.8	2.8
1945	21.1	6.2	4.2	3.0
1946	18.2	5.5	8.3	3.4
1947	16.7	5.2	7.9	3.0
1948	17.0	4.7	7.1	2.8
1949	18.1	5.0	7.4	3.4
1950	16.6	8.4	8.9	3.7
1951	17.3	10.8	6.0	2.8
1952	17.9 (est)	9.7 (est)	5.4 (est)	2.8 (est)

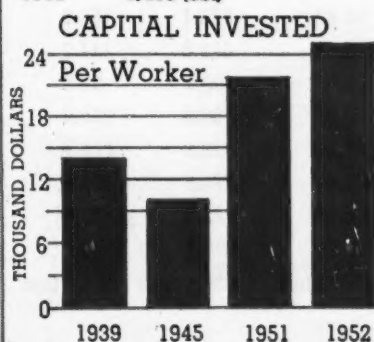
SALES DOLLAR IN 1952



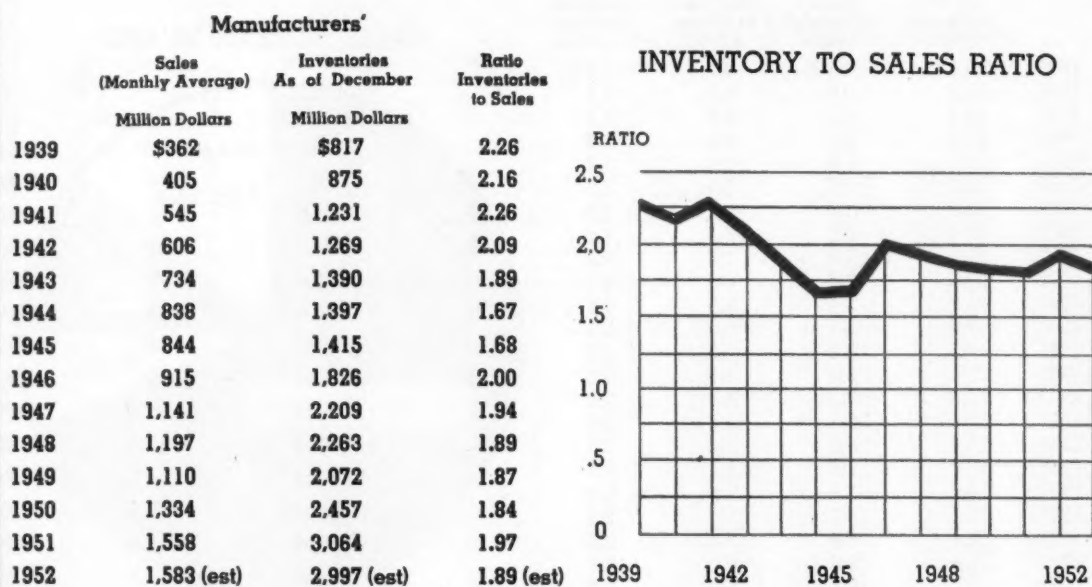
## Products Industry (cont'd)

SOURCE: U. S. Dep't of Commerce; McGraw-Hill Dep't of Economics; Federal Reserve Board; Standard & Poor's; Bureau of Labor Statistics; National Industrial Conference Board; CHEMICAL WEEK

	Capital Expenditures Million Dollars	Index of Capacity 1939 = 100	Wholesale Price Index 1947-49 = 100
1939	N.A.	100	N.A.
1945	376	172	N.A.
1946	800	N.A.	N.A.
1947	1,060	N.A.	101.4
1948	941	250	103.8
1949	670	264	94.8
1950	771	293	96.3
1951	1,283	322	110.0
1952	1,507	357 (est)	104.5 (est)
1953	1,450 (est)		



	Stock Price Index 1935-39 = 100	Capital Invested Per Production Worker	Index of Production 1935-39 = 100
1929	N.A.	N.A.	89
1930	N.A.	N.A.	87
1931	N.A.	N.A.	78
1932	N.A.	N.A.	68
1933	N.A.	N.A.	76
1934	N.A.	N.A.	83
1935	N.A.	N.A.	89
1936	N.A.	N.A.	99
1937	N.A.	N.A.	112
1938	N.A.	N.A.	96
1939	100.0	\$14,336	112
1940	95.4	14,272	130
1941	90.1	12,953	176
1942	82.5	11,240	278
1943	98.6	11,156	384
1944	95.4	10,385	324
1945	110.3	10,209	284
1946	130.9	13,240	236
1947	124.2	15,908	251
1948	130.5	16,882	254
1949	132.5	19,500	241
1950	163.9	20,700	264
1951	218.2	21,700	299
1952	242.8	24,900	299 (est)



**CW Report**

## Chemical and Allied Products Industry (cont'd)

Source: Bureau of Labor Statistics, Census Bureau, CHEMICAL

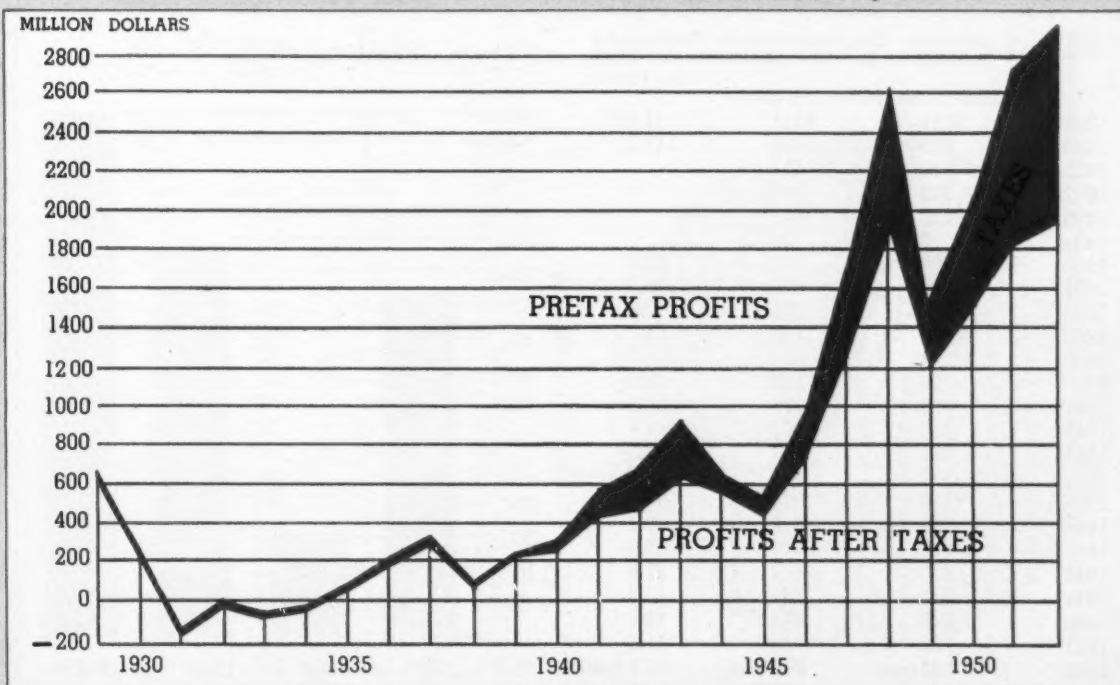
	All Employees	Production Workers	Weekly Hours Worked	Hourly Earnings	Weekly Gross Pay	Weekly Gross Pay Adjusted for Price Changes In 1952 \$	Exports	Imports
	Thousands	Thousands					(Million Dollars)	
1939	406	277	39.5	\$6.49	\$25.59	\$48.93	162.8	79.5
1940	437	302	39.7	.676	26.80	50.76	221.9	58.2
1941	524	381	40.8	.739	30.15	54.42	291.8	60.7
1942	615	471	42.8	.848	36.36	59.22	347.7	88.4
1943	655	520	45.3	.916	41.53	63.79	474.3	203.5
1944	695	551	45.7	.953	43.58	65.83	472.4	156.5
1945	711	555	44.5	.989	43.99	64.98	414.3	144.2
1946	675	517	41.2	1.077	44.34	60.33	500.1	99.6
1947	692	523	41.5	1.232	51.13	60.87	782.9	105.2
1948	699	520	41.5	1.355	56.23	62.13	779.8	111.4
1949	664	485	41.0	1.430	58.63	65.44	773.7	106.8
1950	686	496	41.5	1.510	62.67	69.25	725.1	170.3
1951	749	535	41.8	1.632	68.22	69.83	977.1	300.4
1952	755 (est)	527 (est)	41.4 (est)	1.706 (est)	70.69 (est)	70.69 (est)	920.0 (est)	305.0 (est)

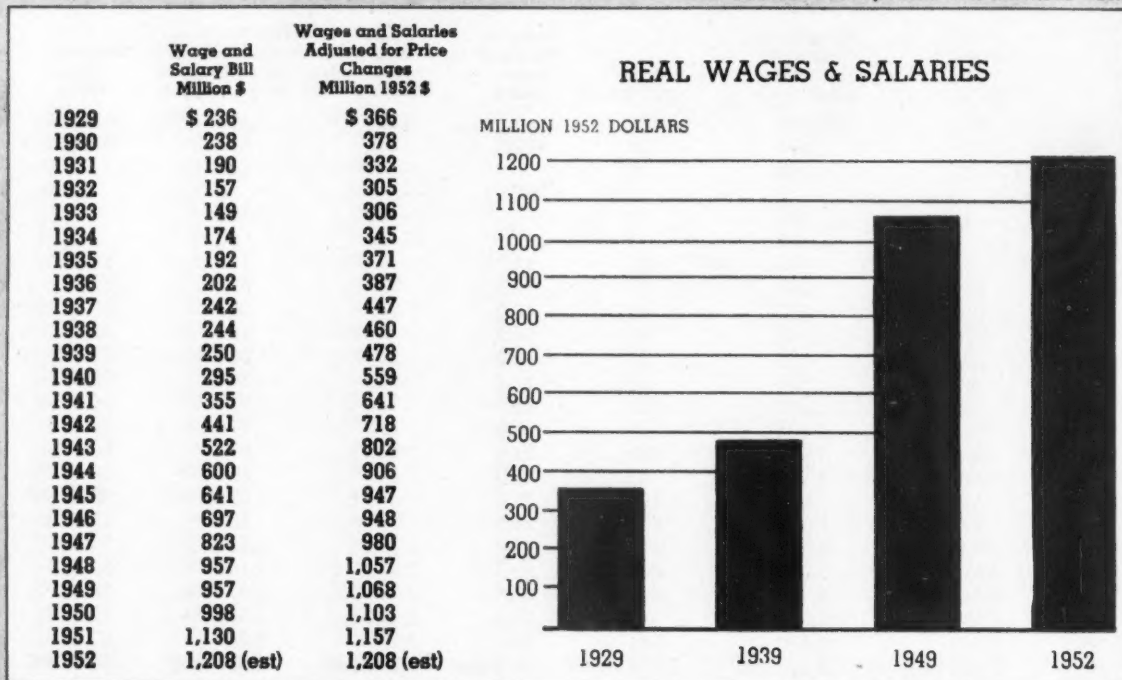
	Pretax Profits Million \$	Pretax Profits Adjusted for Price Changes Million 1952 \$	Taxes Million \$	Taxes as Percent of Pretax Profits	Profits After Taxes Million \$	Profits After Taxes Adjusted for Price Changes Million 1952 \$	Percent on Pretax Profits
1929	\$674	\$1,045	\$60	8.9%	\$614	\$952	91.1%
1930	255	405	33	12.9	222	353	87.1
1931	-123	-215	6		-129	-226	
1932	3	6	6	200.0	-3	-6	
1933	-40	-82	11		-51	-105	
1934	-9	-18	9		-18	-36	
1935	75	145	11	14.7	64	124	85.3
1936	220	421	27	12.3	193	370	87.7
1937	337	623	42	12.5	295	545	87.5
1938	100	188	18	18.0	82	154	82.0
1939	228	436	24	10.5	204	390	89.5
1940	321	608	56	17.4	265	502	82.6
1941	590	1,065	152	25.8	438	791	74.2
1942	697	1,135	222	31.9	475	774	68.1
1943	928	1,425	296	31.9	632	971	68.1
1944	662	1,000	92	13.9	570	861	86.1
1945	550	812	105	19.1	445	657	80.9
1946	964	1,312	236	24.5	728	990	75.5
1947	1,708	2,033	447	26.2	1,261	1,501	73.8
1948	2,617	2,892	689	26.3	1,928	2,130	73.7
1949	1,544	1,723	340	22.0	1,204	1,344	78.0
1950	2,095	2,315	581	27.7	1,514	1,673	72.3
1951	2,745	2,810	943	34.4	1,802	1,844	67.2
1952	2,900 (est)	2,900 (est)	1,014 (est)	35.0 (est)	1,930 (est)	1,930 (est)	66.6 (est)

CW Report

## Petroleum and Coal Products Industry

SOURCE: U. S. Dep't Commerce; CHEMICAL WEEK



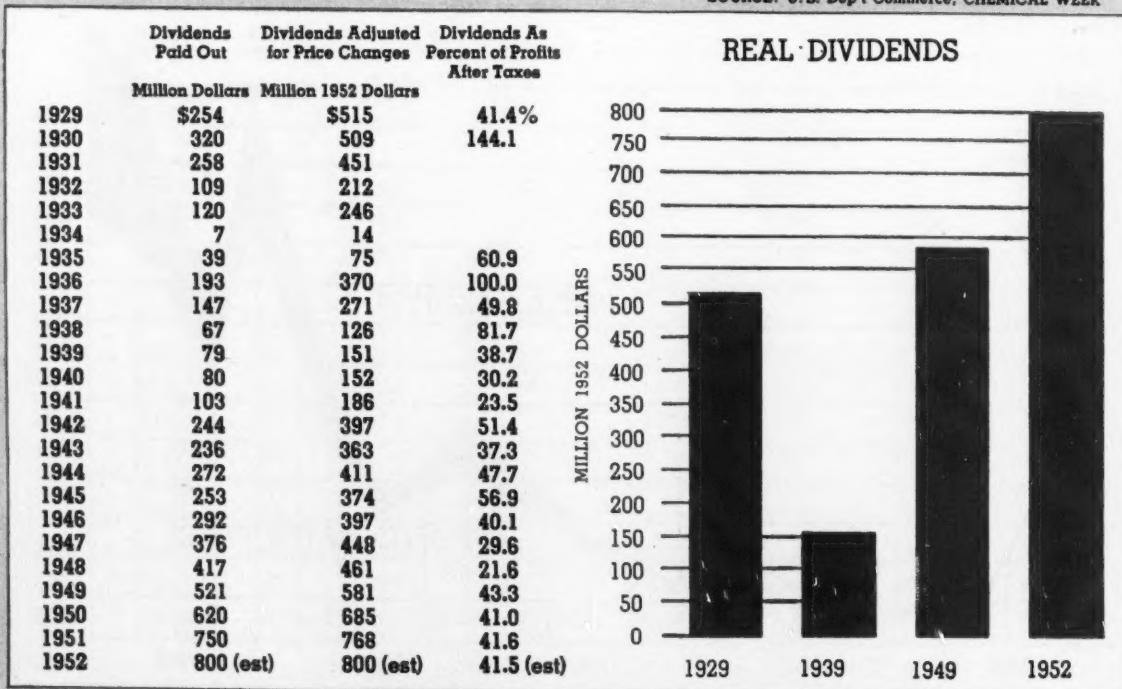


C W Report



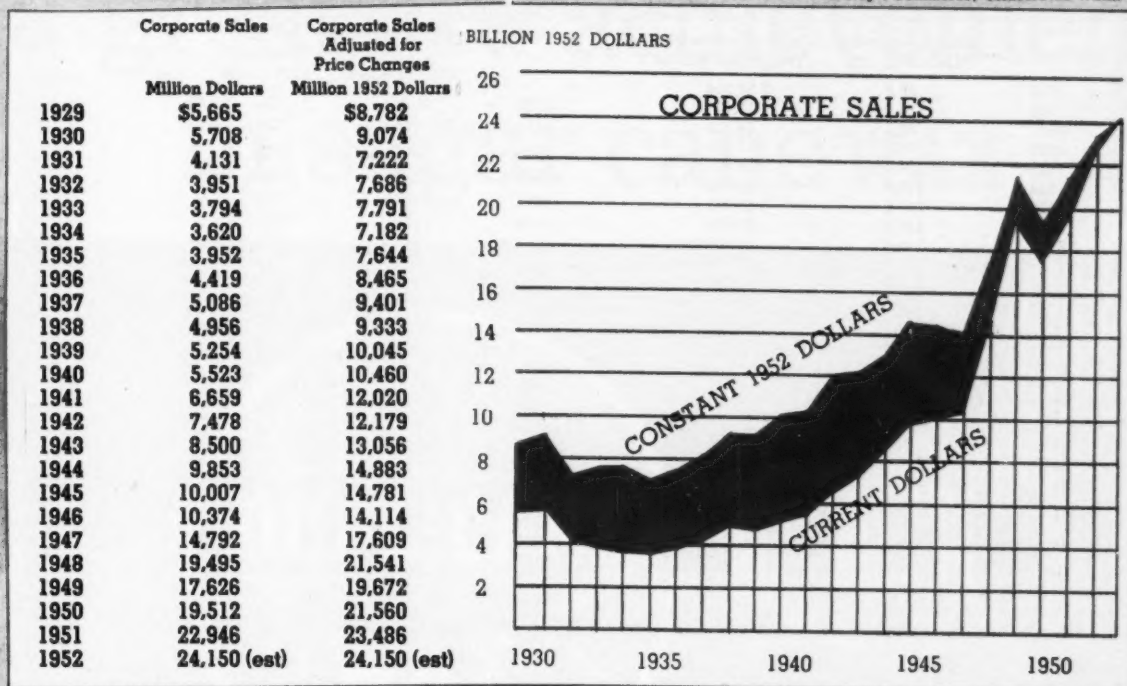
## Petroleum and Coal

SOURCE: U.S. Dep't Commerce; CHEMICAL WEEK



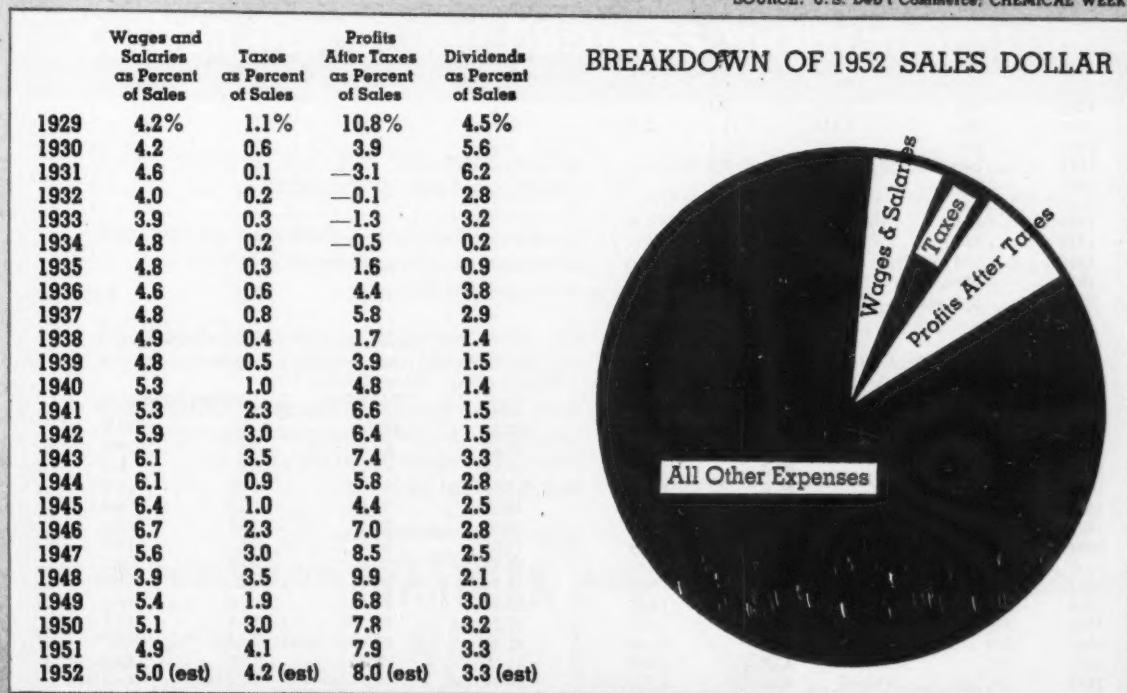
Source: U.S. Dept. of Commerce; CHEMICAL WEEK.

SOURCE: U. S. Dep't Commerce; CHEMICAL WEEK

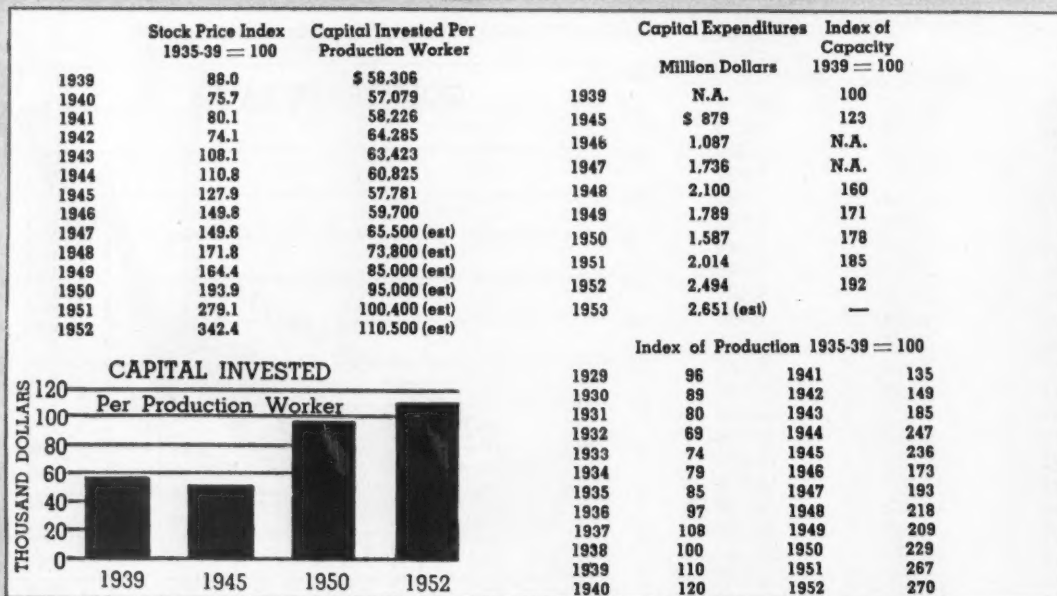


## Products Industry (cont'd)

SOURCE: U. S. Dep't Commerce; CHEMICAL WEEK

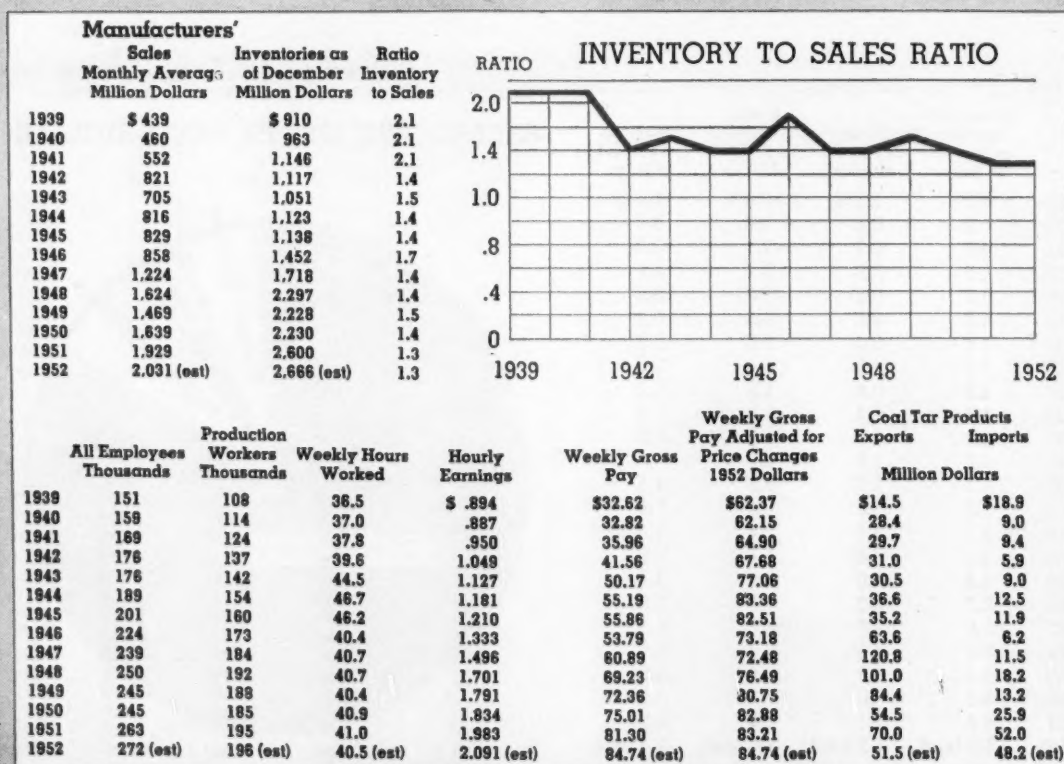


SOURCE: U. S. Dep't of Commerce; McGraw-Hill Dep't of Economics; National Industrial Conference Board; Federal Reserve Board; CHEMICAL WEEK



CW Report

## Petroleum and Coal Products Industry (cont'd)



Source: U.S. Bureau of Labor Statistics; CHEMICAL WEEK; U.S. Bureau of Census.

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*developed especially for the*

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Source: U.S. Bureau of Labor Statistics; CHEMICAL WEEK; Federal Reserve Board.

	Production Workers Thousands	Weekly Hours Worked	Hourly Earnings	Weekly Pay	Weekly Pay Adjusted for Price Changes 1952 Dollars	Output Index 1947-49=100	Wholesale Price Index 1947-49=100
1947	5.7	39.7	\$1.431	\$56.81	\$67.63	108	99.4
1948	5.3	39.9	1.576	62.88	69.48	105	100.3
1949	5.1	39.8	1.677	66.74	74.49	86	100.3
1950	5.7	40.8	1.763	71.93	79.48	105	102.0
1951	7.4	41.0	1.910	78.31	80.15	184	131.0
1952	7.7 (est)	40.3 (est)	1.995 (est)	80.40 (est)	80.40 (est)	191 (est)	123.7 (est)

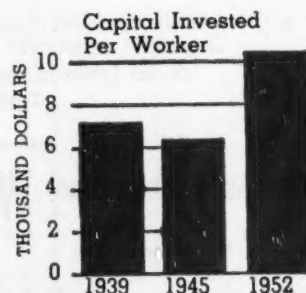
## Synthetic Rubber Industry

CW Report

## Rubber and Products Industry

SOURCE: National Rubber Manufacturers' Assn.; U.S. Dept. of Commerce; Federal Reserve Board; Bureau of Labor Statistics; National Industrial Conference Board; CHEMICAL WEEK.

Consumption Monthly Average				Shares of Consumption		Production Index	Capital Expendi- tures	Wholesale Price Index	Capital Invested Per Worker
Natural	Synthetic Long Tons	Reclaimed	Total	Natural	Synthetic Reclaimed	1935-39=100	Million Dollars	Crude Rubber 1942-49=100	
1929 38,950		18,085	57,035	68%	32%	100	1945 \$118	N.A.	1939 \$7,237
1930 31,333		12,788	44,121	71	29	78	1946 139	N.A.	1940 7,145
1931 29,599		10,250	39,849	74	26	72	1947 143	103.0	1941 6,536
1932 28,062		6,459	34,521	81	19	64	1948 102	103.4	1942 7,730
1933 34,364		7,084	41,448	83	17	77	1949 81	93.5	1943 6,606
1934 38,540		8,405	46,945	82	18	86	1950 102	157.3	1944 6,534
1935 40,962		9,794	50,756	81	19	93	1951 187	215.1	1945 6,292
1936 47,917		11,791	59,708	80	20	107	1952 245(est)	157.3(est)	1946 6,383(est)
1937 45,300		13,500	58,800	77	23	104	1953 271(est)		1947 6,859(est)
1938 36,419		10,067	46,486	78	22	83			1948 7,708(est)
1939 49,333	163	14,167	63,663	78	22	113			1949 9,097(est)
1940 54,042	242	15,854	70,138	77	23	123			1950 8,837(est)
1941 64,583	522	20,936	86,041	75	1%	24			1951 9,046(est)
1942 31,399	1,471	21,235	54,105	58	3	39			1952 10,353(est)
1943 26,470	14,241	24,257	64,968	41	22	37			
1944 12,009	47,223	20,924	80,156	15	59	26			
1945 8,786	57,798	20,086	86,670	10	67	23			
1946 23,133	63,475	22,951	109,559	21	58	21			
1947 46,888	46,639	24,033	117,560	40	40	20			
1948 52,278	36,839	21,759	110,876	47	33	20			
1949 47,877	34,532	18,557	100,966	48	34	18			
1950 60,022	44,857	25,311	130,190	46	34	20			
1951 37,835	63,241	28,843	129,919	29	49	22			
1952 36,667(est)	65,833(est)	23,292(est)	125,792(est)	29(est)	52(est)	19(est)	245(est)		



# Turba-Film Evaporation Process Achieves Amazing Results!

**Turbulent thin film principle evaporates Time-at-Temperature sensitive materials...in seconds.**

The Turba-Film® Continuous Evaporator employs a totally different concept of evaporation. Makes heretofore extremely difficult evaporating processes simple and rapid. Actually evaporates most substances in a few seconds!

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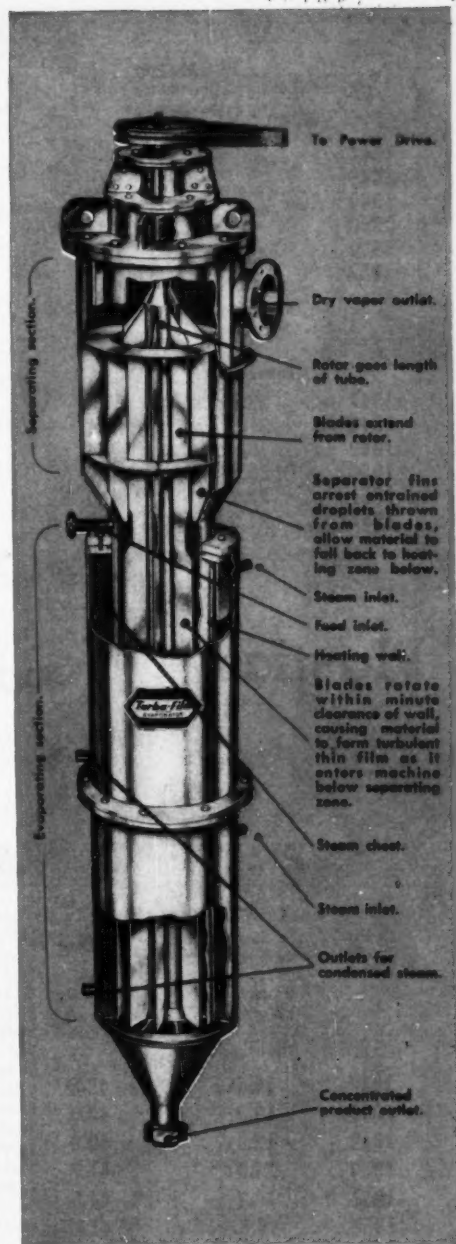
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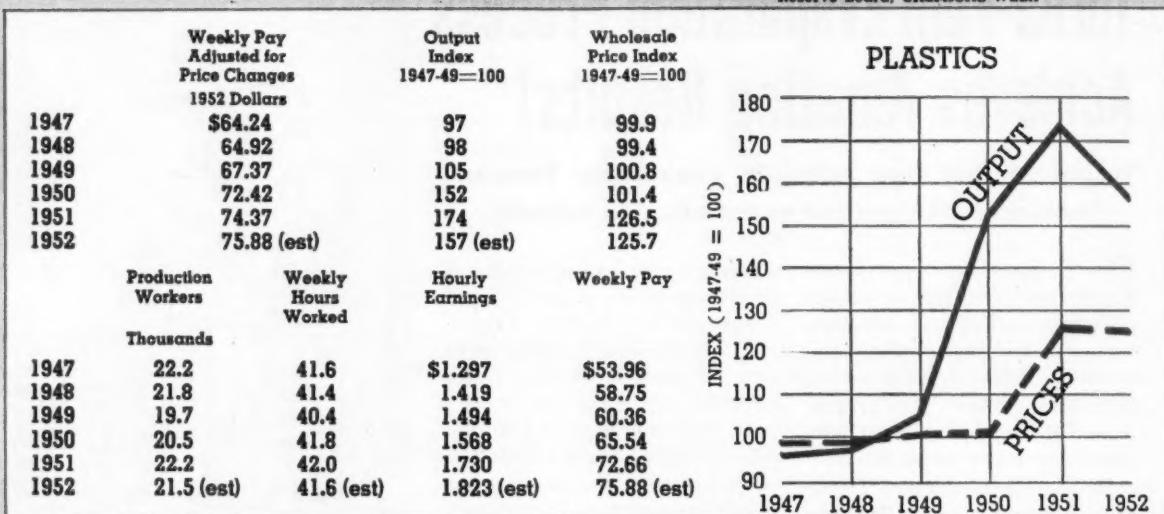
Name.....Title.....

Company.....

Address.....

City.....Zone.....State.....

Type of Industry.....Product.....



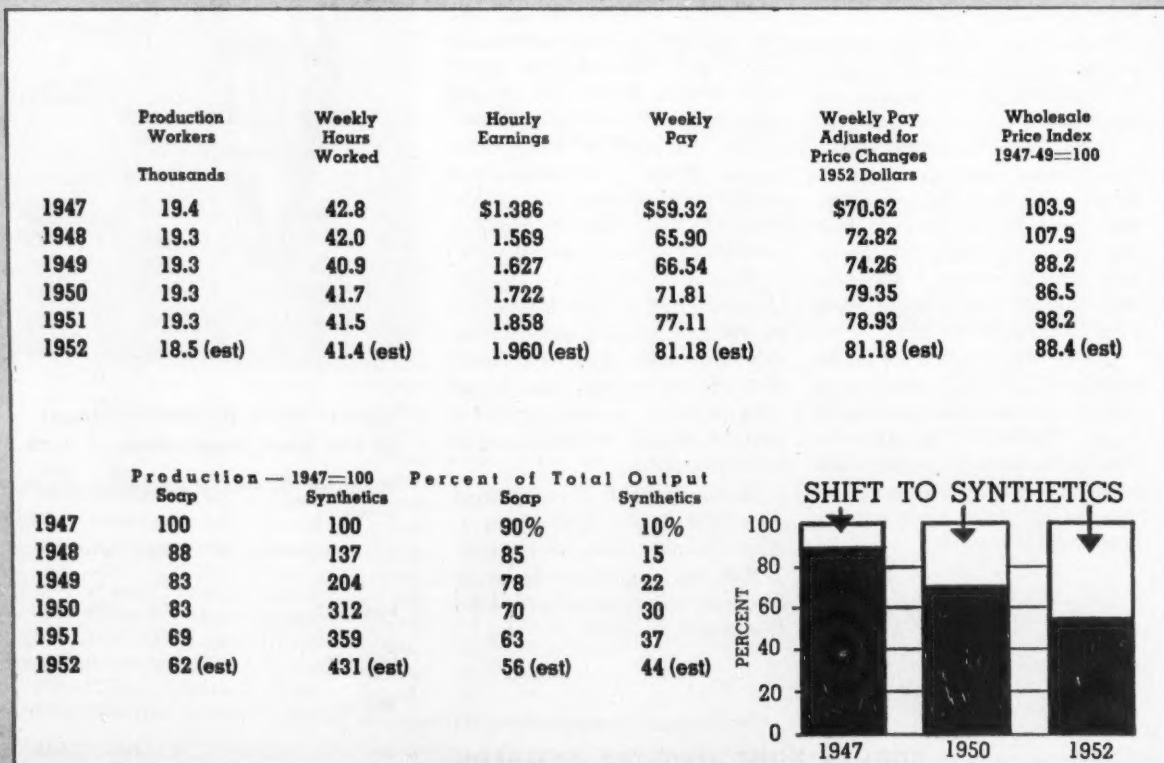
## Plastics

CW Report



## Soaps and Detergents

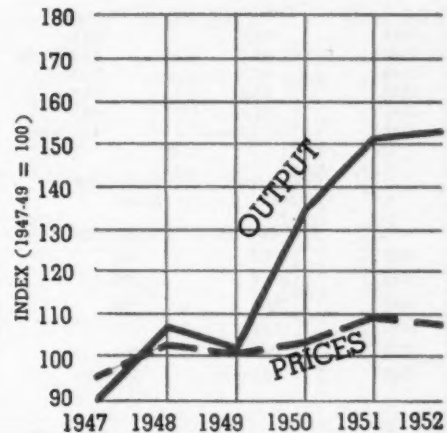
Source: U.S. Bureau of Labor Statistics; Association of American Soap & Glycerine Producers, Inc.; CHEMICAL WEEK.



SOURCE: U. S. Bureau of Labor Statistics; Federal Reserve Board; CHEMICAL WEEK

## SYNTHETIC FIBERS

	Production Workers	Weekly Hours Worked	Hourly Earnings	Weekly Pay	Weekly Pay Adjusted for Price Changes	Output Index 1947-49 = 100	Wholesale Price Index 1947-49 = 100
Thousands					1952 Dollars		
1947	57.9	39.5	\$1.241	\$49.02	\$58.36	90	95.2
1948	59.9	39.5	1.343	53.05	58.62	108	103.2
1949	52.7	38.6	1.430	55.20	61.60	102	101.6
1950	54.7	39.3	1.486	58.40	64.53	135	103.9
1951	55.6	39.4	1.593	62.76	64.24	151	109.7
1952	50.0 (est)	39.8 (est)	1.664 (est)	66.18 (est)	66.18 (est)	153 (est)	107.3 (est)



# Synthetic Fibers

C W Report

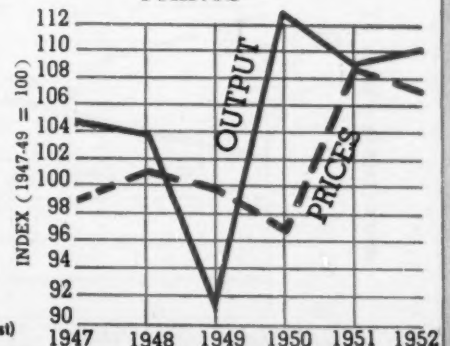
## Paints

Source: U. S. Bureau of Labor Statistics; CHEMICAL WEEK; Federal Reserve Board; U. S. Census Bureau.

	All Employees	Production Workers	Weekly Hours Worked	Hourly Earnings	Weekly Pay	Weekly Pay Adjusted for Price Changes 1952 Dollars	Sales Total Million \$	Distribution		
Thousands	Thousands							Industrial	Trade	Unclassified
1939			40.5	\$ .704	\$28.48	\$54.46	\$32.9	37%	54%	9%
1940			40.6	.722	29.26	55.42	34.4	39	52	9
1941			41.6	.779	32.35	58.39	46.3	41	50	9
1942			41.8	.861	35.92	58.50	44.1	40	49	11
1943			45.8	.926	42.31	64.99	47.4	44	47	9
1944			47.4	.967	45.76	69.12	51.5	43	48	9
1945			46.7	1.005	46.93	69.17	53.7	42	48	10
1946			42.5	1.102	46.79	63.66	66.2	37	53	10
1947	68.3	45.9	42.3	1.261	53.34	63.50	86.5	37	53	10
1948	70.7	46.9	42.2	1.384	58.40	64.53	87.8	37	53	10
1949	67.3	43.3	41.0	1.458	59.78	66.72	78.4	35	55	10
1950	71.4	46.8	42.3	1.532	64.80	71.60	94.0	37	54	0
1951	75.6	49.1	41.9	1.643	68.84	70.46	98.4	38	52	10
1952	74.4 (est)	47.5 (est)	41.4 (est)	1.721 (est)	71.25 (est)	71.25 (est)	112.4 (est)	38 (est)	62 (est)	—

## PAINTS

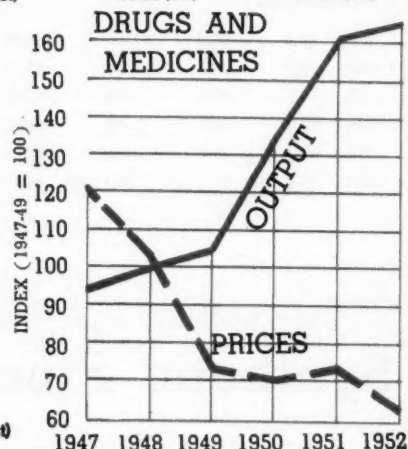
			Exports	Imports
			Million Dollars	
Wholesale Price Index	Output Index		1939	
1947-49=100	1947-49=100			
1947	99.1	105	\$22.8	\$1.5
1948	101.0	104	22.4	1.0
1949	99.9	91	27.1	0.8
1950	96.8	113	20.4	0.6
1951	108.9	109	22.5	0.3
1952	107.4 (est)	110 (est)	25.7	1.1
			30.8	1.1
			50.6	1.3
			85.5	1.6
			80.2	2.0
			76.4	1.4
			79.4	3.6
			103.2	5.3
			79.7 (est)	4.0 (est)



SOURCE: U.S. Bureau of Labor Statistics; CHEMICAL WEEK;  
Federal Reserve Board; U.S. Census Bureau

	All Employees Thousands	Production Workers Thousands	Weekly Hours Worked	Hourly Earnings	Weekly Pay	Weekly Pay Adjusted for Price Changes 1952 Dollars
1947	93.6	63.9	40.7	\$1.185	\$48.23	\$57.42
1948	89.5	59.9	40.6	1.323	53.71	59.35
1949	92.3	60.8	40.4	1.401	56.80	63.17
1950	95.8	62.7	40.9	1.457	59.59	65.85
1951	106.2	69.7	41.1	1.521	62.51	63.98
1952	110.3 (est)	69.8 (est)	40.0 (est)	1.587 (est)	63.38 (est)	63.38 (est)

	Wholesale Prices 1947-49=100	Production Index 1947-49=100	Exports Million Dollars	Imports Million Dollars
1947	120.8	95	1939 \$ 22.3	\$ 5.5
1948	104.6	100	1940 29.3	4.6
1949	74.7	105	1941 43.9	8.6
1950	70.2	135	1942 43.8	2.7
1951	73.9	161	1943 69.0	4.9
1952	63.6 (est)	166 (est)	1944 106.2	13.3
			1945 115.8	10.0
			1946 144.6	8.4
			1947 176.7	7.6
			1948 193.2	6.2
			1949 199.2	5.9
			1950 212.5	7.8
			1951 281.4	11.8
			1952 224.8 (est)	6.5 (est)



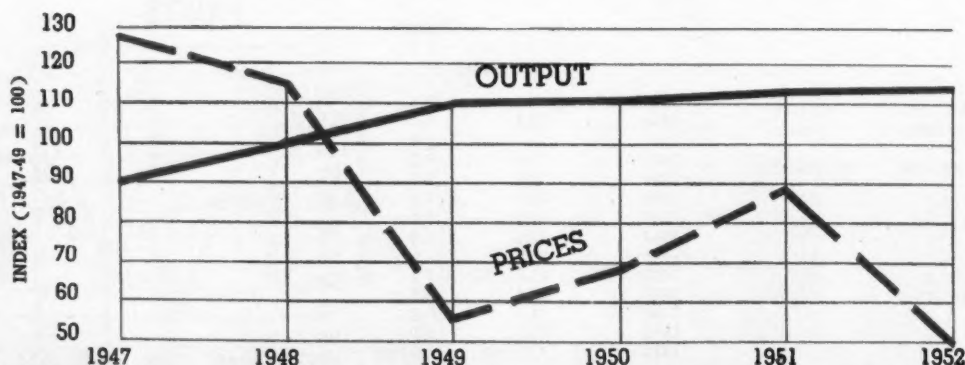
CW Report

## Drugs and Medicines

## Vegetable and Animal Oils and Fats

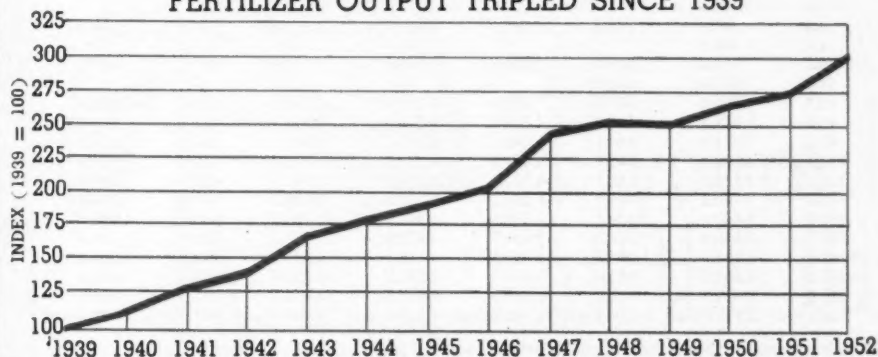
Source: U.S. Bureau of Labor Statistics; Federal Reserve Board; CHEMICAL WEEK.

	All Employees Thousands	Production Workers Thousands	Weekly Hours Worked	Hourly Earnings	Weekly Pay	Weekly Pay Adjusted for Price Changes 1952 Dollars	Output Index 1947-49=100	Wholesale Price Index 1947-49=100
1947	55.7	46.9	46.8	\$0.987	\$46.19	\$54.99	90	127.6
1948	56.2	46.6	47.4	1.063	50.39	55.68	100	115.9
1949	56.1	46.1	47.2	1.083	51.12	57.05	110	56.6
1950	54.5	43.8	45.5	1.175	53.46	59.07	111	68.7
1951	55.1	43.2	46.0	1.274	58.60	59.98	112	88.8
1952	50.0 (est)	39.0 (est)	45.9 (est)	1.321 (est)	60.55 (est)	60.55 (est)	113 (est)	49.7 (est)



	All Employees	Production Workers	Weekly Hours Worked	Hourly Earnings	Weekly Pay	Weekly Pay Adjusted for Price Changes	Wholesale Price Index	Output Index
	Thousands	Thousands				1952 Dollars	1947-49=100	1939=100
1947	36.7	31.4	42.4	\$0.945	\$40.07	\$47.70	95.0	1939 100
1948	35.9	30.2	41.5	1.020	42.33	46.77	100.6	1940 114
1949	34.3	28.6	41.6	1.075	44.72	49.91	104.6	1941 126
1950	34.0	27.8	41.3	1.138	47.00	51.93	101.7	1942 144
1951	34.8	28.0	42.2	1.236	52.16	53.39	106.3	1943 169
1952	35.1 (est)	28.0 (est)	42.4 (est)	1.319 (est)	55.93 (est)	55.93 (est)	110.6 (est)	1944 179
								1945 193
								1946 209
								1947 247
								1948 254
								1949 252
								1950 268
								1951 275
								1952 302 (est)

FERTILIZER OUTPUT TRIPLED SINCE 1939



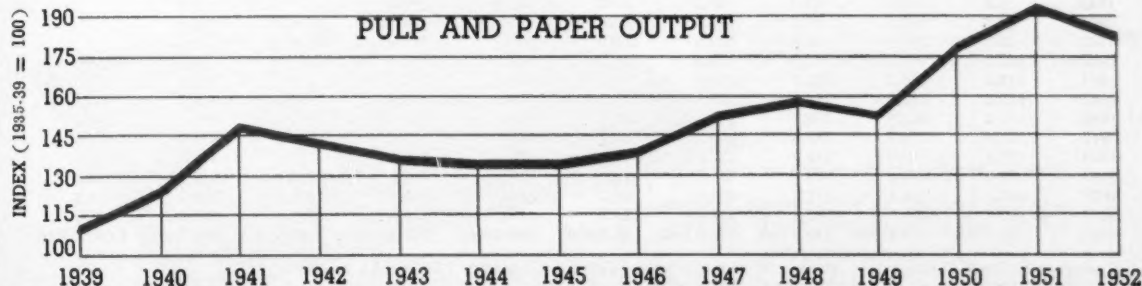
C W Report

## Fertilizer Industry

## Pulp, Paper and Board Mills Industry

	All Employees	Production Workers	Weekly Hours Worked	Hourly Earnings	Weekly Pay	Weekly Pay Adjusted for Price Changes	Output Index	Wholesale Price Index
	Thousands	Thousands				1952 Dollars	1935-39=100	1947-49=100
1939			40.3	\$0.620	\$24.92	\$47.85	113	
1940			40.5	0.646	26.13	49.49	124	
1941			42.7	0.705	30.08	54.30	148	
1942			43.0	0.797	34.21	55.72	143	
1943			46.3	0.850	39.36	60.46	137	
1944			48.0	0.883	42.41	64.06	135	
1945			48.0	0.913	43.85	64.77	135	
1946			44.3	1.049	46.54	63.32	140	
1947	234.0	206.9	44.2	1.224	54.10	64.40	153	94.8
1948	240.7	210.8	44.0	1.361	59.88	66.17	159	103.9
1949	226.9	197.6	42.4	1.411	59.83	66.77	153	101.3
1950	235.8	205.1	43.9	1.492	65.06	71.89	179	103.4
1951	245.7	212.2	44.4	1.603	71.17	72.85	193	119.6
1952	244.0 (est)	208.0 (est)	43.6 (est)	1.684 (est)	73.38 (est)	73.38 (est)	184 (est)	119.3 (est)

PULP AND PAPER OUTPUT



	Chemical Lime	Potash Equivalent K <sub>2</sub> O	Titanium Dioxide Content	Chlorine	Synthetic Anhydrous Ammonia	Caustic Soda Total	Soda Ash Total	Sulfuric Acid Gross Production	Hydro- chloric Acid	Phosphoric Acid
	Thousand Short Tons	Thousand Short Tons	Thousand Short Tons	Thousand Short Tons	Thousand Short Tons	Thousand Short Tons	Thousand Short Tons	Million Short Tons	Thousand Short Tons	Thousand Short Tons
1929	1,795.0	61.6		219.0	173.3	761.8	2,268.2	5,314.5	81.3	17.3
1930	1,447.0	61.3	0.9	205.0						
1931	1,463.2	63.9	1.2	202.0	127.1	658.9	2,275.4	3,809.3	54.9	19.0
1932	1,118.6	62.0	2.2	193.0						
1933	1,486.0	143.4	2.9	236.0	150.2	687.0	2,317.0	3,599.5	62.6	24.7
1934	1,663.6	144.3	3.5	285.0						
1935	1,592.3	192.8	4.4	330.0	138.8	759.4	2,508.9	4,264.9	87.1	45.4
1936	1,924.5	247.3	4.4	380.0						
1937	2,151.4	284.5	4.4	446.3	223.0	968.7	3,037.4	4,974.6	121.4	78.3
1938	1,761.6	317.0	4.4	440.0						
1939	2,220.0	312.2	9.7	514.4	310.8	1,045.4	2,947.9	4,795.0	140.3	153.8
1940	2,643.8	379.7	12.0	605.0	465.0					
1941	3,561.2	524.9	13.1	800.8	501.3	1,429.3	3,724.4	6,770.1	227.7	662.6
1942	3,776.1	679.2	43.8	989.8	543.3	1,574.2	3,924.8	7,754.0	296.9	617.4
1943	4,307.8	739.1	97.9	1,214.4	543.4	2,249.1	4,571.1	8,422.1	342.5	636.8
1944	4,196.4	834.6	134.4	1,262.4	543.7	2,327.8	4,718.0	9,242.2	381.0	696.5
1945	3,810.3	874.2	148.3	1,192.1	548.7	2,321.8	4,556.8	9,522.1	407.6	730.9
1946	3,684.5	931.8	137.7	1,165.1	725.5	2,292.2	4,493.6	8,649.2	341.6	894.6
1947	4,035.2	1,029.9	162.1	1,443.2	1,114.0	2,596.5	4,801.1	10,780.2	442.6	1,062.4
1948	4,255.4	1,139.9	186.7	1,640.0	1,089.8	2,937.7	4,872.9	11,455.9	458.3	1,193.5
1949	3,619.0	1,118.4	195.9	1,767.0	1,294.1	2,649.5	4,119.3	11,431.9	494.0	1,394.5
1950	4,137.3	1,287.7	240.3	2,084.2	1,565.6	2,989.1	4,329.6	13,029.4	618.8	1,634.6
1951	4,400.0 (est)	1,420.3	272.0	2,517.9	1,767.0	3,756.9	5,457.9	13,372.3	693.5	1,846.2
1952	4,000.0 (est)	1,550.0 (est)	304.0 (est)	2,553.0 (est)	2,013.0 (est)	3,460.0 (est)	4,633.0 (est)	13,268.0 (est)	667.5 (est)	2,100.0 (est)

Source: Facts for Industry; Census of Manufactures; Bureau of Mines; CHEMICAL WEEK.

CW Report

## Production of Selected Inorganic and Organic Chemicals, 1929-1952

	Benzene Chemical Grade	Naphtha- lene	Phthalic Anhydride	Phenol	Aniline	Acetone	Refined Glycerine	Acetylene	Formal- dehyde 37% HCHO by Weight	Ethylene
	Million Gallons	Million Pounds	Million Pounds	Million Pounds	Million Pounds	Million Pounds	Million Pounds	Million Cu.Ft.	Million Pounds	Million Pounds
1929	25.1	39.2	9.2	24.2	33.7	36.0	141.9	969.5		
1930	19.9	31.7	6.7	21.1	26.4	36.0	116.1			
1931	14.8	35.0		18.0		25.9	130.0	743.0		
1932	11.4	25.8	6.3	14.0	19.4	39.0	101.2			
1933	19.4	30.6	14.1	33.2	29.5	47.5	128.0	754.1		
1934	23.8	37.9	20.7	44.9	28.8	60.0	123.9			
1935	24.1	47.7	23.4	43.4	32.6	68.9	119.9	1,143.2		
1936	19.4	89.5	31.2	48.7	38.5	94.6	126.5			
1937	26.8	116.0	45.2	65.7	38.9	124.0	139.0	1,511.4		
1938	17.7	53.6	27.7	44.5	26.7	110.0	129.5			
1939	30.5	104.1	44.3	68.6	41.8	160.0	146.8	1,291.2	134.5	
1940	36.6	159.6	58.0	96.1	55.7	201.5	155.9		180.9	
1941	44.8	197.8	81.3	115.0	70.0	259.1	194.3	2,384.6	309.9	
1942	85.3	250.9	94.8	127.3	100.9	338.2	180.6	3,236.2	347.5	
1943	142.0	305.3	114.1	195.0	94.3	347.6	159.7	4,532.4	522.9	166.2
1944	178.4	286.2	122.7	202.0	89.1	384.8	196.1	5,536.1	522.4	272.2
1945	156.2	287.6	125.8	205.1	87.2	349.8	172.8	5,100.0	509.6	308.2
1946	136.4	242.3	108.7	199.1	88.4	335.9	148.6		458.9	294.6
1947	167.7	314.7	137.5	265.3	107.0	397.2	191.2	3,007.0	615.9	342.0
1948	173.9	327.6	158.8	297.3	92.1	470.6	197.3		617.2	383.4
1949	133.3	236.0	149.7	224.5	72.0	413.0	200.1	4,750.0 (est)	549.7	1,129.3
1950	186.2	288.5	216.2	312.1	98.0	462.5	230.0	5,331.0	635.1	1,821.9
1951	265.7	355.7	248.0	388.4	122.7	559.7	215.0	5,851.0	997.5	1,798.9
1952	255.0 (est)	430.0 (est)	240.0 (est)	360.0 (est)	90.0 (est)	480.0 (est)	200.0 (est)	5,500.0 (est)	905.0 (est)	1,600.0 (est)

Source: U.S. Tariff Commission; Census of Manufactures; Facts for Industry; CHEMICAL WEEK.



Illustration courtesy of  
The Murray Corp., Detroit

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then you'll realize that NEVILLE plays an important part in the production of many household items, whether it's a bath-mat, stair-treads, drain-mats, floor-tile or molded electric plugs, as well as enamels, paints or varnishes. In countless every-day products, quality and durability are assured when the manufacturer uses

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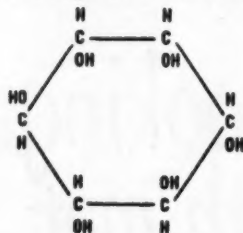
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## RESEARCH . . .

### Alternative to Administration

How best to utilize the talented researcher with little administrative ability, and keep him happy in the process, is a problem that currently is wrinkling management brows.

The answer: a program of non-managerial advancement. Here's how one company has made it work.

Nowadays—when a new research man is hard to find, and harder to keep—conservation of research talent should be the first rule of the well-managed industrial firm. Conservation means more than granting the junior members of the laboratory staff an extended reprieve from the test-tube brush. It means, very simply, utilizing your researchers—junior and senior—to the full measure of their capabilities. That's the best way yet discovered to keep them happy.

But keeping the average researcher contented generally isn't just a problem of eliminating the menial or routine. As a matter of fact, keeping the average researcher happy isn't much of a problem at all. Given interesting projects, a fair salary and good working conditions, he's a busy fellow, usually headed for an administrative post in research or a job with a good future somewhere else in his company.

**The Square Peg:** It's the exception who presents the problems. He's the fellow who isn't sure where—or indeed, if—he's going any place. It's not that he lacks ability; on the contrary, his scientific talent is in most cases appreciably better than average. But his talent lies in one direction. He usually has little aptitude and less inclination for administrative or supervisory work. Yet administration and supervision are the conventional keys to career advancement in industry.

What to do about this dilemma is the issue that is currently wrinkling management brows. The typical progressive research executive recognizes the incalculable long-term value of his top scientific minds, is vitally concerned with their morale. His approach to those few who will always be happiest and most productive in the laboratory, however, may vary considerably from company to company.

The candid admission of one research manager, perhaps, reflects the most widespread prevailing attitude: "We give them challenging work, pay them well, don't worry too much about their souls." But there's another, more recent, school of thought that subscribes wholeheartedly to the first two tenets of this theory, introduces a

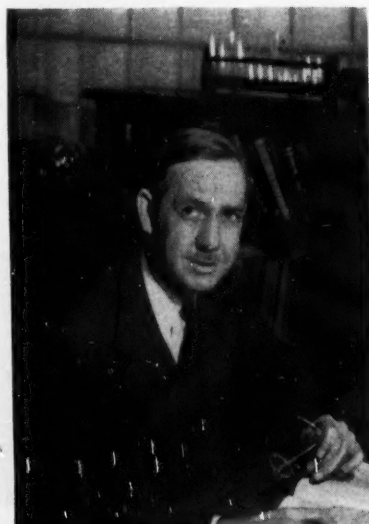
distinctive feature of its own in the form of a program of non-managerial advancement. Though far from prevalent, the newer idea now has active adherents scattered throughout the broad sweep of the process industries.

**The Square Hole:** In the chemical industry, it's the moving force behind Monsanto Chemical Co.'s "senior scientist" plan and the "research associate" program of several departments of the Du Pont Co. Experience with these well-conceived projects has a timely lesson to teach.

The Du Pont program, a pioneering effort in the field, underscores the basic principles and pitfalls in this novel field, gives a good idea of what to expect from a similar plan. Here's what makes it tick:

Du Pont's "research associate" program is not a company-wide plan. Each of the individual research divisions of the company's 13 manufacturing and auxiliary departments are free to adopt it (or a similar plan) at their discretion. Textile Fibers Dept. (formerly Rayon Dept.) launched the project, has just seen it through its seventh full year.

The plan, as set up in Textile Fibers' research division, provides for three



**FOR THE DESK:** The average researcher.

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It can well be a profitable move for you to investigate the unusual properties that make Du Pont Sulfamic Acid such a versatile chemical.

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Less corrosive than muriatic and sulphuric acids, yet quick-acting, Sulfamic Acid is used as a cleanser in many industries. For example, it is used to clean stainless-steel milk pasteurizers and sugar-mill evaporators. When added to amines, Sulfamic Acid softens and adds fire resistance to paper in one low-cost treatment.

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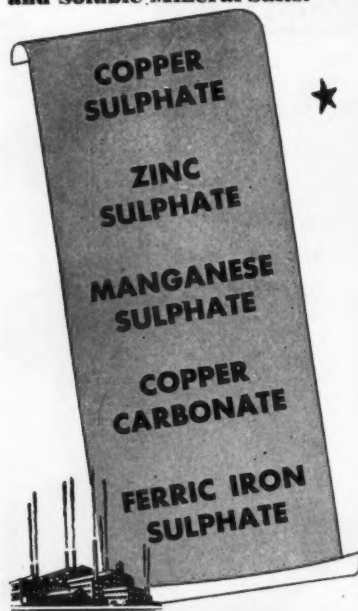
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## RESEARCH . . . . .



**FOR THE BENCH:** The highly talented  
exception.

classifications of advanced, non-administrative positions: junior research associate, which corresponds in rank and remuneration to research supervisor or leader of a group of six to eight chemists; research associate, which is on a par with research manager (heads two or three groups); and senior research associate, which is on the level of laboratory director—a position that carries the responsibility of overseeing several research managers.

Appeal of the research associates plan to the man of outstanding scientific ability is obvious. At the senior level the research associate has substantial freedom in selection of his work and assistants. He's almost completely detached from the necessity of having to deliver on particular assignments, has considerable latitude for exploratory work.

Research associates at all levels are encouraged to publish their findings (after astute commercial exploration), attend scientific meetings and contact other investigators, both in and outside the company. In short, they have most of the prerogatives of the academic scientist, a considerably better income, and no teaching duties.

**More Than Seniority:** Selecting people for these unique positions is a serious and tricky business. The all-important criterion is scientific merit. Seniority alone—emphasizes Winfield Heckert, Textile Fibers' assistant general manager in charge of the research division—will not get a man a research associate post.

But there's another aspect to the problem. Aside from being high in scientific talent, the ideal candidate is disinterested in administration. Heckert, from long standing observation,

reports no difficulty in recognizing the outstanding cases, points out that they're the ones who "get into things too deeply to worry about the management phase of the business." Unfortunately, not every candidate is the ideal case. It's here that the judges are on their own.

From accumulated experience, however, a working rule-of-thumb has been developed: It must be clearly apparent to the successful candidate's supervisor and associates at the bench that he's the man for the job. And that's not begging the question, either. For experience has proved that the best research associate prospects are the scientific leaders of their laboratories—the men who gain a reputation in one specialty, are frequently consulted by fellow researchers in the company.

**Few Are Chosen:** The fraternity of research associates within the Du Pont Co.'s burgeoning Textile Fibers Dept. is an exclusive one. There are so many administrative opportunities, few of its technical staff have ever been considered; fewer were picked.

The reason may come as a jolt to those who still think of the scientific researcher in terms of the absent-minded professor in a mysterious world of fuming beakers and bubbling flasks. Heckert puts it this way: "With few exceptions, the best researchers make the best administrators. They have the knack of organizing their time efficiently, a vital asset."

Have the non-managerial advancement schemes paid off? Like so many other questions that may be asked about the whole subject, this one isn't easy to answer. In Du Pont's Textile Fibers Dept., research associates have—on their own initiative—come up with some good things that were not envisioned by research management. But on the whole, commercially valuable results have not been immediately apparent. And that's as it should be; research associates concentrate on fundamental problems, are not expected to produce quick results. Even in the long run their contributions may add more to fundamental knowledge than to commercial profit.

A different yardstick is needed to measure the worth of these "pure" scientists of industry. Monsanto believes that a talented researcher who is allowed to refine his scientific aptitude in a specialized field is of infinitely more value to the company as an expert in that field than he would be as an administrator.

**Works Both Ways:** Morale-building considerations also loom large. The non-managerial posts give the man with little administrative interest the

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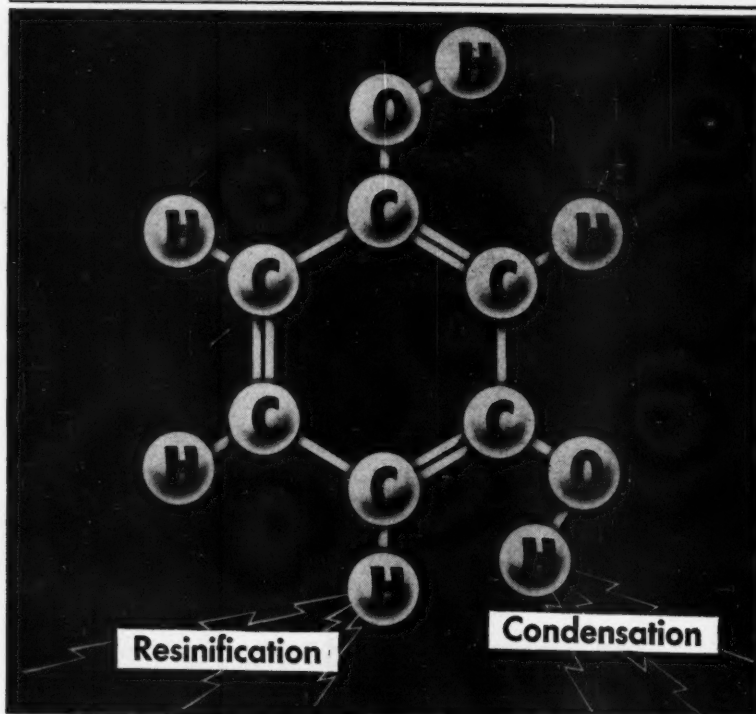
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## Koppers Chemicals

## RESEARCH . . . . .

satisfying opportunity of seeing his name climb in his firm's organization table. The Du Pont Textile Fibers Dept. plan, at its inception, doubled the number of promotions open to men of the research division.

But morale can go down as well as up. And that's a real danger if the standards of admission are not kept high—if the researchers are given any reason to believe that a plan of non-administrative advancement is being used as a shelving device.

If on no other count, the imaginative plans are bound to be a success on the strength of an increasingly vital public relations objective implicit in their very existence. They go a long way toward making a scientific career in industry as attractive as one in management.

## Research at a Risk

Attempting to add color to cut-and-dried statistics, Boston's American Research and Development Corp. this week prefaced its annual stockholders meeting with an animated exhibition of results.

The show, "Products With a Future," was AR&D's way of telling stockholders and public alike that venture capital, judiciously invested in research, isn't such a risk after all. With men like Harvard's Gen. Georges F. Doriot as president and MIT's Karl T. Compton as chairman, AR&D looked like a worthwhile gamble to SEC more than six years ago. At that time, SEC okayed the use of risk capital by such conservative institutions as John Hancock Mutual Life Insurance Co. and Massachusetts Investors Trust for indirect investment in struggling young businesses through purchase of American Research stock.

Composed of sizzling, whirling and clicking displays as diverse as frying shrimp and Van de Graaff accelerators, the exhibit was staged by 25 AR&D affiliates, ranged in beauty from barking Joe Captan\* to smiling Miss Polymer.

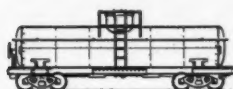
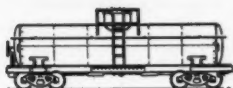
With his nose to the ground, Joe missed many of the Products With a Future. But visitors from industry were paying more attention to a brace of products and processes out of the labs and pilot plants of member companies.

Highspots of the showing were:

- Ionics, Inc.'s (Cambridge) refrigerator-size demineralizer for industrial installations where technical supervision is available. Ionics says the unit will produce 200 gal./hour

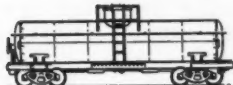
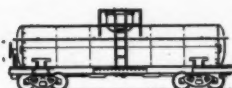
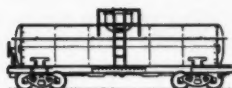
\* Thoroughbred English bloodhound used by Natural Gas Odorizing Co., Inc. (Houston, Texas) to sniff out gas leaks in underground pipes.

# buying caustic soda



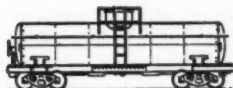
Purity was a special problem to a company manufacturing soap, cleansers and other household products. They needed caustic that was exceptionally clear in solution and contained a very low metallic content.

## to better advantage



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## from Mathieson

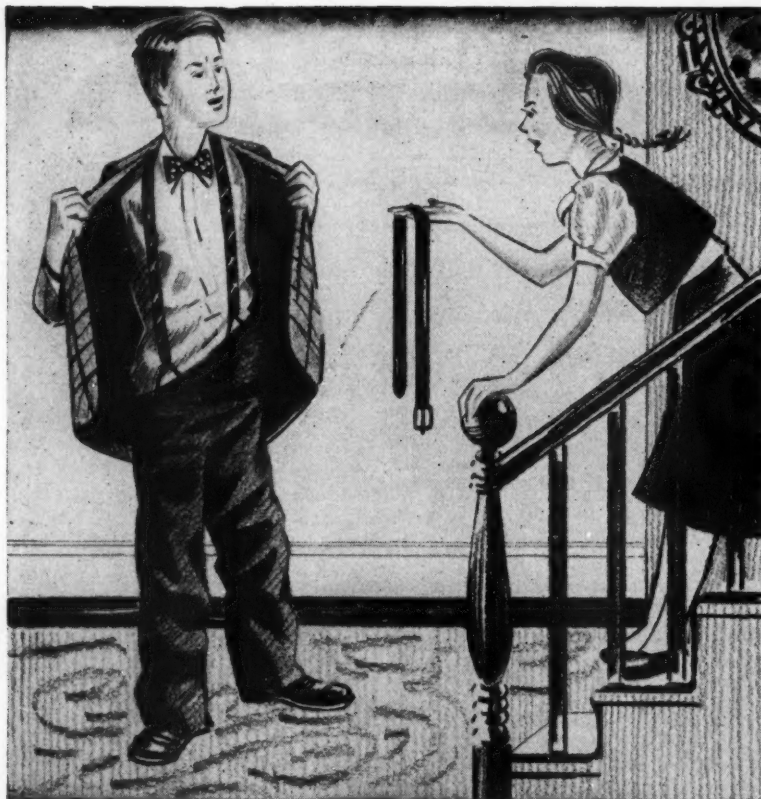


These same advantages will be of benefit to you. You'll be sure of top-quality chemicals . . . multi-plant production facilities provide dependability . . . integrated delivery system assures on-time schedules. You'll find you can buy chemicals to better advantage—at any time—by consulting with Mathieson.

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## RESEARCH . . . . .

of fresh soft water from a salty, brackish supply.

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- Control Engineering Corp.'s (Norwood, Mass.) new Mass-Meter—an instrument that will continuously weigh, the firm claims, "anything that will flow or fall through a pipe."

- Carlon Products Corp.'s (Cleveland, Ohio) varied-size flexible plastic pipe; and Flexible Tubing Corp.'s (Guilford, Conn.) multi-purpose flexible ducting.

- Secotan, Inc.'s booth with but a pair of shoes and two pieces of hide. The Somerville (Mass.) corporation claims to have a process capable of tanning a hide (one side) within 15 minutes after removal from the liming tank. Key: instead of the conventional soaking, Secotan presses the tanning solution through the hide.

- Baird Associates, Inc.'s (Cambridge) new flame photometer for rapid electrolyte measurement and its comparator densitometer for determining photographic densities.

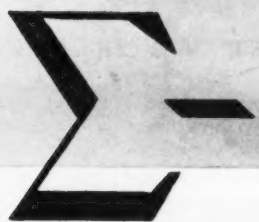
- High Voltage Engineering Corp.'s (Cambridge) Van de Graaff particle accelerator for physical research.

- Snyder Chemical Corp.'s (Bethel, Conn.) Synco specialty resins.

- Tracerlab, Inc.'s instruments and isotopes for atomic applications ranging from cancer control to beta thickness gauges.

With other companies (e.g. Reaction Motors and Magnecord) rounding out a distinguished list of affiliates present and accounted for, American Research put its best foot forward with assurance. It had ample reason: Rapidly growing affiliates have more than offset AR&D's two previous unsuccessful ventures. With over \$3 million in the bank, American Research is now looking for investments rather than investors.

**Ideas Wanted:** Aluminum Co. of America (Pittsburgh, Pa.) is still beating the bushes for profitable applications of its \$1,000-plus-a-pound metal, gallium. In the two years since Alcoa spread the word of the unique metal's possibilities, only a handful of minor uses have developed. But the company hasn't given up hope for the low-melting (86 F), high-boiling (3,600 F) oddity, cites a spate of poten-



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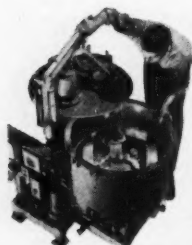
"Sure, your mixing problems  
are **DIFFERENT**  
... that's why you need  
**MIXING EQUIPMENT**  
**ENGINEERED** to meet  
your specific requirements"

• Having helped in the successful solution of hundreds of chemical process and food industry mixing problems, we *know* how different these jobs can be... there are hardly any two that can be handled in exactly the same way. And because these mixing, blending, reaction jobs are so widely diversified, you need the kind of equipment *and* experience that will give you the best solution, in the shortest time, at the lowest possible cost.

That's where *we* come in. We have the production "know-how" and we have the equipment. Simpson Mix-Mullers are the answer to any mixing problem involving dry, wetted or pasty materials, and are without equal when it comes to thorough mixing and blending to exacting specifications... thanks to the *controlled, proved Mulling Principle of Mixing!*

Why not submit your mixing problems to us for analysis? No obligation, of course.

... here's how we solved some typically different mixing problems:

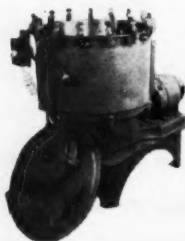


#### PILOT PLANT WORK

View shows a laboratory size Simpson Mix-Muller, specially equipped for mixing under vacuum and heat, in pre-testing trial batches in pilot plant work for electrical porcelain production.

#### ELECTRICALLY-HEATED

Special 24-in. laboratory size Mix-Muller, with thermostatically-controlled electric heating elements. Designed to operate under vacuum or pressure in preparing experimental batches. Equipped with stainless steel pan.

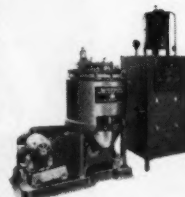


#### CORROSION-RESISTANT

This No. 2 Simpson Mix-Muller has stainless steel mixing surfaces for corrosion-resistance and improved sanitation. Unit is also jacketed for circulation of steam to aid in chocolate preparation.

#### HOT OIL CIRCULATION

This versatile No. 00 Mix-Muller prepares an infinitely variable number of different mixes under widely varied conditions. Equipped for vacuum and pressure, and jacketed for hot oil circulation.



WRITE FOR LITERATURE



**SIMPSON MIX-MULLER DIVISION**

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612 Machinery Hall Building  
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## RESEARCH . . . . .

tial uses. Dilemma: high cost has a decided cooling effect on experimental ardor, yet only a healthy new market can lower cost.

**Gifts of the Soil:** Michigan soil has given up a new antibiotic to researchers of Upjohn Co. (Kalamazoo). From a submerged culture of a micro-organism found in an earth sample taken near company headquarters, Upjohn scientists have isolated a substance showing marked anti-TB activity. It's called amicetin, is now being tested for clinical potential.

Upjohn also rates plaudits this week for a new method of preparing compound F. Key: a fermentation process similar to the Upjohn method for cortisone. Like the earlier process, the new synthesis hinges on a microbiological oxidation of progesterone to yield a convenient intermediate. Straight chemical techniques take up at this point, convert the intermediate to the cortisone-related hormone.

**New Perspective:** Great Britain's Heavy Chemicals Productivity Team, after a close look at the American industrial research structure, recently concluded:

• British chemical research is of higher quality, lower quantity.

• American industrial chemical literature is excellent in quantity, scope and format, but lacks "clear, logical and scientific treatment."

• If the British heavy chemical industry has anything to learn from the American, it is to be more selective in its applied research; tighten liaison between research and production on day-to-day problems; and increase research strength, particularly on the engineering side.

**New TB Weapon:** Latest word from Charles Pfizer & Co. (Brooklyn) on antibiotics is that its viomycin is being made available to tuberculosis specialists and physicians throughout the country. The drug has been the subject of intensive research and clinical tests for four years, says Pfizer. It adds that the new drug bulks large as a TB weapon because it's effective against strains that have developed a resistance to drugs currently available.

**Polyethylene Transformed:** Atomic scientist A. Charlesby of England's atomic energy research establishment at Harwell has achieved vitally interesting results in studies of the effects of radiation on polymers. The British researcher discovered that high-energy radiation materially increases cross-linking in substances like poly-

# • Davison Bulletin •

## *Check for application* AVAILABLE FOR THE FIRST TIME **Organic Silicofluorides**

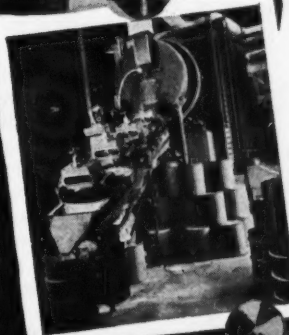
Davison's Research and Development Department has devised a method of commercially producing a series of silicofluorides which have previously been known only as laboratory curiosities. Now available:

Methylamine Silicofluoride ( $C_2H_7N_2SiF_6$ )  
Dibutylamine Silicofluoride ( $C_{12}H_{28}N_2SiF_6$ )  
Ethylhexylamine Silicofluoride ( $C_{17}H_{37}N_2SiF_6$ )  
Aniline Silicofluoride ( $C_7H_7N_2SiF_6$ )  
Rosin Amine Silicofluoride ( $C_{10}H_{15}N_2SiF_6$ )  
Morpholine Silicofluoride ( $C_4H_9NO_2SiF_6$ )

Preliminary use research has led Davison's technical representatives to believe that there are many varied applications for these products.

The properties of the materials vary widely. The molecular weight is from 206 to 719; fluorine content 18.2% to 55.17% and pH in 5% water solution, 2.8 to 4.2.

For full chemical and physical properties write for Product Data Sheet on Davison's Organic Silicofluorides, today.



## **Anti-Blocking Agent**

Davison now has available a series of high quality, uniform fine sized silicas. The amorphous form of silica possesses unique characteristics when compared to crystalline silicas, e.g. sand. Silica gel, a highly porous form of amorphous silica, characteristically has a large pore volume and surface area. For example, when divided into fine particles less than 20 microns, the porous high surface area characteristics continue to exist, making the product specific for a wide variety of special applications. The product is white in appearance and completely uniform in chemical and physical characteristics.

Commercial forms of silica gel available differ primarily in pore size, surface area, and apparent bulk density. These differences, in addition to the variations produced by surface treatments and particle sizing, have resulted in a series of finely divided silicas adaptable to diversified uses. Many of these grades are now available for anti-blocking and flaking plastic sheeting.

Mail coupon for complete information, chemical and physical characteristics, and suggested applications, or contact your Davison Field Service Engineer.

## **FREE Literature Available On Method Of Determining Fluid Catalyst Particle Size**

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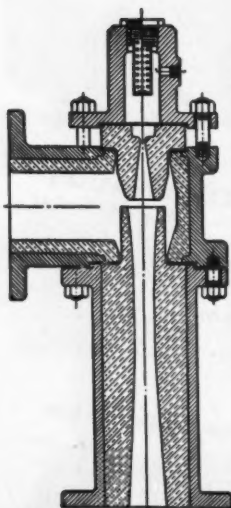
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## RESEARCH . . . . .

ethylene, nylon, and unvulcanized rubber. And the degree of cross-linking is, roughly, proportional to the radiation dose.

Charlesby's efforts thus far have been concentrated on polyethylene. He has found that above a certain level of irradiation, the polymer becomes insoluble in most organic materials, assumes a sharply increased melting point. If the dose is boosted further, polyethylene goes through an elastic stage, finally becomes a hard, glass-like material.

Significance of the polymer irradiation work: it points the way to a potentially important non-chemical method of altering the chemical structure of polymers, highlights a possible new industrial use for atomic energy.

**Off the Fairway:** United States Rubber Co. has just concluded a conditional purchase contract for an 80-acre site adjoining the Hackensack Golf Club in Bergen County, N.J. The land will give U.S. Rubber the space it needs for a proposed new research center to house basic studies on rubber, rubber chemicals, plastics and textiles. The proposed research center would supplement the company's Passaic, N.J., general laboratories, about 12 miles away.

**Debut in Drums:** Propargyl alcohol and propargyl bromide are newly available in drum lots from General Aniline and Film Corp. The acetylene derivatives, produced at GAF's Grasse, N.J., plant, show interesting possibilities in the preparation of essential oils, pharmaceuticals, plastics and plasticizers.

**For Research:** Another newcomer bowing this week is 9,10-dihydroxystearic acid, available in research quantities from Arnold, Hoffman & Co., Inc. (Providence, R.I.). A white to pale tan, the solid is potentially useful in the production of waxes, detergents, greases and plasticizers.

**X-ray Opportunity:** There's no dearth of available instruction in X-ray diffraction. Aside from the General Electric course (CW, Feb. 21), a five day session (April 20-24) will be held at North American Philips Co.'s Mount Vernon (N.Y.) application laboratory.

**Sugars in Color:** Indian researchers at Institute of Sugar Technology (Kanpur) report a new chromatographic reagent for sugar analysis. It's *p*-anisidine phosphate, gives distinctively different colors on interaction with various sugars.



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**NEW LOW PRICES**

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## **ACRYLIC MONOMERS**

A reduction of 12%-14% in the prices of some of the Rohm & Haas acrylic monomers became effective February 1. The prices of ethyl acrylate and methyl acrylate were reduced from 48c and 49c respectively to 42c per pound in tank cars. This reduction is the direct result of production economies made possible by an 8-million-dollar addition to the Rohm & Haas plant at Houston, Texas. The new unit was designed to manufacture these monomers by a completely new, patent-protected process, involving, as starting materials, carbon monoxide, acetylene and an alcohol. This new plant and process are the latest developments in more than 20 years of continuous developments in acrylics.

The outstanding properties of acrylic polymers and copolymers have long been recognized, and advantage is being taken of them in many fields. Products already benefitting from these properties include protective coatings, leather and textile finishes, sizing for nylon, adhesives, synthetic rubber, lubricating oil additives, water paints, and soil conditioners, as well as the Rohm & Haas acrylic plastic, PLEXIGLAS\*.

Acrylates impart to their polymers and copolymers these advantageous properties:

- Better heat and light stability
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- Increased polymerization rate and copolymer yield

Acrylic monomers are now being used in copolymers with vinyl chloride, vinyl acetate, vinylidene chloride, acrylonitrile, butadiene, styrene and unsaturated polyesters. These new low prices warrant careful consideration of the use of acrylates in your products.

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# PRODUCTION ...



CATALYST CHARGING: One instead of twenty.

## One Up on Silver

Simpler equipment requirements, a higher rate of conversion and a plant that can be built for half the cost of a conventional plant. Those are some of the eye-opening claims made by Reichhold Chemical for the process being employed at its new (CW, Jan. 3) formaldehyde plant in Seattle.

Previously, Reichhold had bought its formaldehyde from the Bishop (Tex.) plant of Celanese. The only trouble with that arrangement was that the long freight haul just about double the cost of the product for the West Coast customers. Celanese sells formaldehyde for 2¢/lb. in Texas, but delivers it on the West Coast in tank-car quantities for 3.95¢/lb. (uninhibited) and 4.20¢/lb. (inhibited with 7-8% methanol).

With the freight costs in mind, Reichhold explored the possibilities of making its own, finally emerged with what it describes as a "new" process—although it does admit the process has been tried out in Europe. The new plant will turn out formaldehyde at the rate of 24 million lbs. a

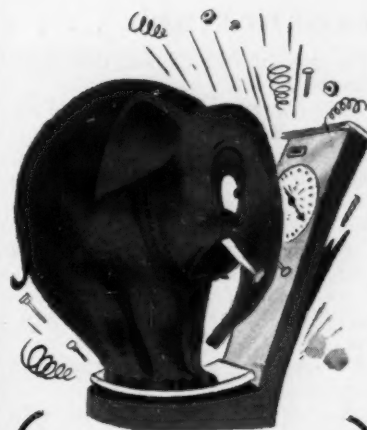
year when it hits full stride. Since the company has also acquired a "substantial interest" in Watson-Park Co., a formaldehyde producer in Ballardvale, Mass., Reichhold now boasts a capacity of 50 million lbs./year.

**More in Sight:** But that may only be the beginning. The process looks so good that the company envisions an expansion program that would push production to 120 tons/day.

That would involve new plants, probably at Detroit, Tuscaloosa (Ala.) and Port Moody (B.C.).

Reichhold thinks its formaldehyde will be competitive with that made by the silver process. The plants can be built for only half the cost—mainly because of simpler equipment requirements. Details of the process are still considered confidential but the key is the catalyst, which Reichhold describes as a "combination of metallic oxides."

In the usual methanol-oxidation process for formaldehyde, methanol is vaporized, mixed with air and sent through a converter where it comes into contact with the silver catalyst.



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## PRODUCTION . . . . .

The product is scrubbed, then fractionated.

The new process boasts several advantages, says Reichhold:

- It requires only a single converter, 5 ft. in diameter, instead of the 20-50 converters of the silver process, but there are no by-products.
- It requires no stripping columns and no rectification of alcohol.
- Yields run better than 95% compared to 85-90% for the silver process.
- Stainless steel requirements are appreciably less.

Silver, of course, isn't the only catalyst that can be used. Copper has also been found satisfactory. And there's a well-known process that entails the use of mixed oxides of molybdenum and iron. In this process, a high conversion is achieved and little methanol has to be removed. In many respects, in fact, it answers to Reichhold's description of the Seattle plant. The firm, however, disclaims any similarity.

### Closer to Commerce

The idea of getting pulp and paper economically from bagasse has met with little but skepticism in this country. But it will be a commercial reality this year if present plans of the recently organized Valentine Pulp and Paper Co. materialize.

Valentine intends to build a \$2,633,200 plant at Lockport, La. (about 35 miles southwest of New Orleans). It's scheduled to turn out 50 tons of pulp a day to be converted into dissolving pulp and newsprint. Construction is slated to start as soon as Washington approves the project.

Technical feasibility of the process was proved in a pilot plant where newspaper of 100% bagasse was produced. Tests were run on the presses of three Louisiana newspapers. A small pilot-plant roll was run for strength tests on the high-speed presses of the New Orleans *Times-Picayune*. Results were satisfactory.

**Long Time Coming:** Engineering and construction will be handled by Brown & Root, Inc. (Houston). It will install a process developed by Edward L. Powell, a chemical engineering consultant in Chattanooga as modified by Valite Corp., a producer of plastics and resins from bagasse and Valentine's parent corporation. Both Valite and Powell have had a long-standing interest in the utilization of bagasse. Powell, in fact, has spent 12 years on the subject, the last three in scaling his process up to commercial stage.



READING THE PRINTS\*: Higher yields through a departure in method.

Briefly, the process makes use of a prehydrolysis treatment of the bagasse, then an alkaline extraction of the hydrolyzed materials. Residual pulp can be bleached by any one of several cycles—depending on its eventual use.

The plant site at Lockport was chosen because of its proximity to Valite's sister organization, Valentine Sugar Co. Officials figure that the refinery and others in the area can meet all foreseeable requirements for bagasse, since 750,000 tons of bagasse are produced annually within a 100-mile radius and only 200,000 tons are used commercially.

Here's how the operation will look when the plant is completed: Bagasse, collected during the grinding season (fall and early winter) will be baled in specially designed equipment. Bales will be piled up in checkered stacks to prevent combustion and to preserve them. This method of storing causes an intense fermentation action during the initial stages. But after that the action ceases, and no further change takes place.

The bacterial action reduces the moisture content from 50% down to 20%. Preservation of the stacked bagasse will follow the usual practice of the industry—application of a light spray of boric acid around the base of each tier.

Since bagasse is bulky, a rapid processing cycle has been developed. Bales will be conveyed to the digester, broken apart and the bagasse shredded. It will then be charged to a

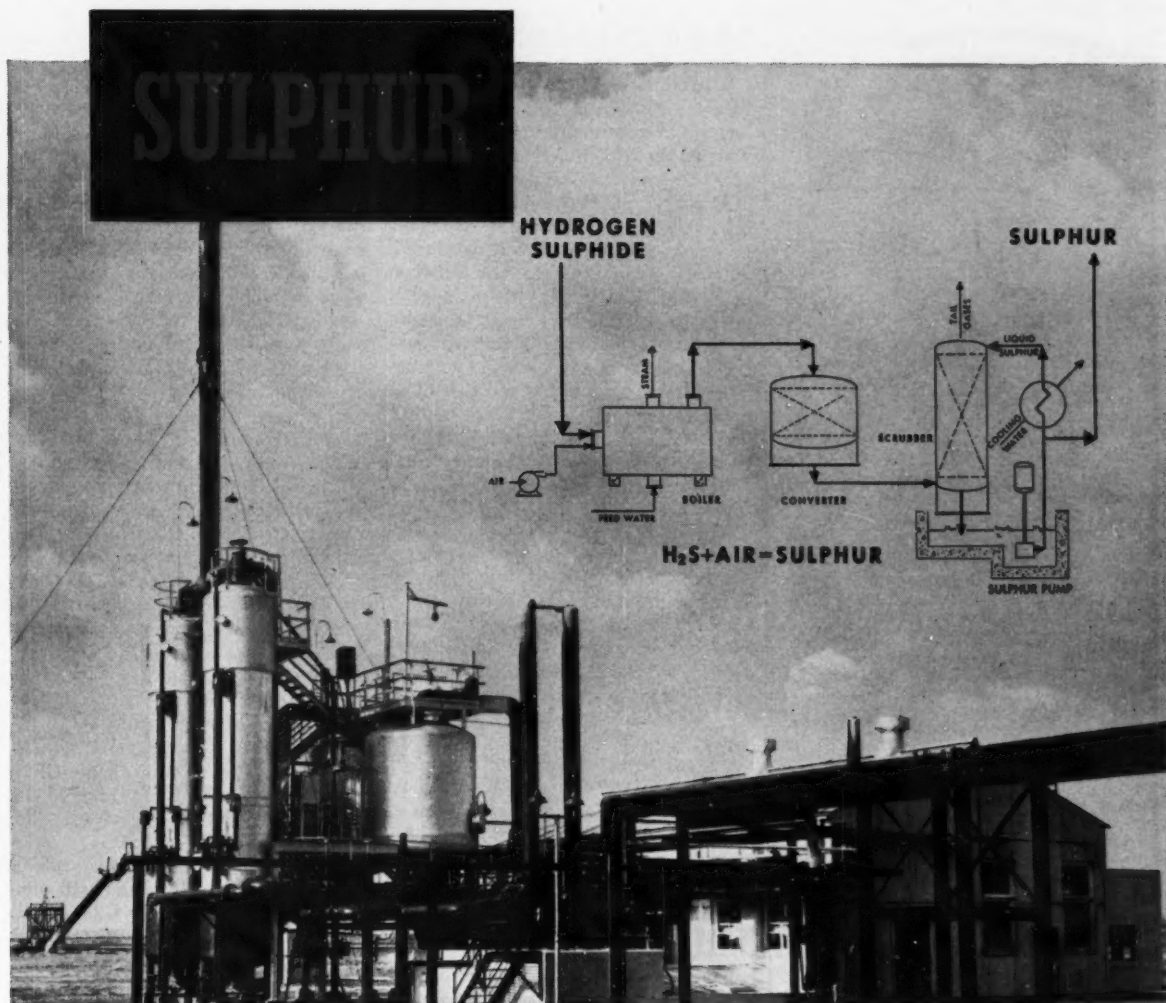
rotary digester where it will be given a pre-hydrolysis treatment. Pretreated fibers are given an alkaline extraction under heat and pressure.

After extraction, contents of the digester will be blown to a blowpit, washed in brown stock washers and passed over a coarse screen. From there the fibers are transferred to conventional bleachers and subjected to the proper bleaching cycle.

Washed pulp so produced is then ready for light refining schedules before going to the paper machine. Because of the known characteristics of the bagasse fibers, any stock refining will be necessarily light. Pulp from the process is then ready for handling on conventional machines.

**Adding Them Up:** Despite the skepticism with which the idea of paper from bagasse has met in the past, Valite figures the project has some decided advantages. Water requirements per ton of product, for instance, are lower than the standard pulp and paper process. At Lockport, it will get water from wells in the adjacent Bayou La Fourche. And waste disposal, a headache for most pulp and paper mills, is not expected to pose a problem because the chemical input is lower than for a comparable wood pulp mill. Moreover, Valite says that disposition of the effluent is not a serious problem. It will use a closed white water system.

\* Examining the blue prints are F. W. Bell, manager of Brown & Root's petroleum and chemical division, and Inventor Powell.



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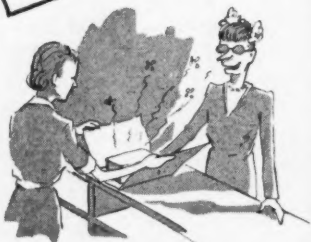
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## PRODUCTION . . . . .

Powell is quick to point out that because of the inherent properties of bagasse fiber, strength for strength and weight for weight, a much thinner sheet of paper can be produced.

It says, too, that high yields and relatively low investment costs mean that pulp and paper can be produced at costs comparable to any existing processes. The yields, he maintains, are made possible by a departure from methods of other investigators who applied conventional wood pulping schedules in evaluating bagasse as a paper-making material. These give pulp yields of less than 20%, while Powell claims his method shows consistent values of 50%.

## Triple Threat

At the upcoming Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy next week, Consolidated Engineering Corp. (Pasadena, Calif.) will introduce its latest analytical mass spectrometer. Designed for petroleum and chemical processing, the new instrument can monitor, analyze, or detect leaks.

The range of Consolidated's spectrometer is somewhat limited; only molecules with mass 12 through 40 can be monitored with satisfactory separation between adjacent masses. But where that degree of separation is not important, the range can be extended to mass 80. And scanning below mass 12 can be accomplished by adding an accessory movable shunt to the analyzer magnet. Trace impurities can also be monitored, for a manually operated attenuation control permits increasing sensitivity in discreet intervals up to 1,000-fold.

The new instrument is reportedly capable of monitoring a single component in a gas stream continuously, or several components alternately. Periodic scanning of preselected group of masses can be performed automatically by means of an accessory programmer. The feature that should make the instrument attractive to production men, says Consolidated, is its cost: with accessories, it should run under \$10,000.

## EQUIPMENT . . . . .

**Insulating Blocks:** Supertemp P. V. (Pressure Vacuum) insulating blocks are Eagle-Picher's (Cincinnati) latest entry into the field of insulating materials. Produced by a new process developed by the firm, the new blocks are recommended for temperatures up to 1,900 F. Big advantages claimed by Eagle-Picher: high breaking strength, light weight.

**Cleaning the Air:** A new exhaust head for industrial stacks guaranteed to be 99% effective is being marketed by the V. D. Anderson Co. (Cleveland). It works on a centrifugal principle, but has no moving parts, hence requires little maintenance, says the company. Vapor enters the head, is engaged by a stationary centrifugal element which imparts a controlled rotational motion to the vapor. Entrained particles, oil and water are thrown to the outer walls where they exit through a drain.

**Two in One:** A plastic coating that can serve as a protective coating and means of identifying insulated pipelines is being introduced by the Armstrong Cork Co. (Lancaster, Pa.). Tagged Insulcolor, it can be applied by brush or by spraying. It comes in six colors, also white where color is not desired for line identification. It's said to be resistant to bumping and abrasion, fire-retardant (when dry) and odorless. And it's recommended for temperatures up to 160 F.

**Firm Purchase:** Newark Wire Cloth Co. (Newark, N.J.) has purchased the Cosgrove Wire Cloth Co. (Belleville, N.J.). Cosgrove will continue to operate under the old name as a subsidiary of Newark Wire Cloth and will continue to specialize in very wide cloths.

**Three Additions:** Pioneer Pump, Division of Detroit Harvester Co. (Detroit) has added three new centrifugal pump models to its line of over 400 centrifugal and positive displacement pumps. One feature of the new models, says Pioneer, is the separate intake bracket and support column. That makes for easier maintenance since the motor and column can be removed without disconnecting the intake bracket and discharge piping. They are particularly suited, it claims, for handling liquids that are heavily entrained with abrasive chips and other solids. All three are available in sizes from 1/20 to 5 hp. Larger sizes are rated up to 148 gpm. at free flow and at 9 gpm. at 124.7 ft. of head (based on water at 60 F.).

**Copper-Clad Advance:** Metals & Controls Corp., General Plate Division (Attleboro, Mass.), is bringing out a new high-conductive spring material with spring properties said to be comparable to hardenable steel. It's Conflex copper-clad hardenable steel—a layer of medium carbon steel with a thinner layer of electrolytic copper clad to one or both sides. Big advantage, according to the manufacturer.



## Is $\text{CH}_3\text{OH}$ Your Best Buy In Antifreeze?

Most car owners can save money *safely* when they buy antifreeze. They are the motorists who can answer "yes" to these three questions:

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3. Do you need protection only for temperatures higher than  $30^\circ$  below zero?

If you have three "yes" answers to these questions, then  $\text{CH}_3\text{OH}$  (methanol) is unquestionably your best buy in antifreeze. Not only will methanol give your

car 100% antifreeze protection, but you'll save yourself between \$2 and \$3 on each gallon you buy!

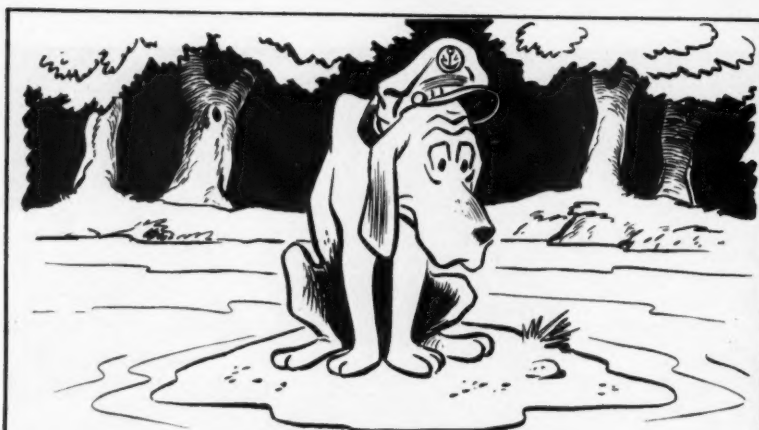
Spencer Chemical Company is a leading supplier of methanol antifreeze to some of America's largest private brand distributors. In addition, Spencer ships commercial methanol in standard methanol tank cars or in steel drums in carload quantities. For further information, write today to Spencer Chemical Company, Executive and Sales Office, Dwight Building, Kansas City, Missouri.

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## PRODUCTION . . . . .

er, is its low cost compared with hardenable copper alloy metals. It also claims the material has a high electrical, thermal conductivity; excellent ductility; good spring properties after heat treatment; resistance to corrosion; and easily electroplated.

**Boston Distributor:** Atlas Chain and Manufacturing Co. (Philadelphia) has appointed Warren M. Pike Associates, Inc. (Boston) as master distributors of Atlas Chain for the Metropolitan Boston area.

**New Gasket:** Victor Manufacturing and Gasket Co. (Chicago) thinks it has filled a gap in its line of gaskets with a new material, Asbestoprene, made of asbestos and Du Pont's neoprene. The new material, says Victor, combines the heat resistance of asbestos with the compressibility of rubber. Previously, it says, when design engineers wanted that combination, they had to settle with glue-glycerine treated paper. Asbestoprene, it claims, has more heat resistance, is more compressible, also has better dimensional stability, does not cause corrosion of light metals and is resistant to oils, gasoline and antifreeze solutions.

**Stack 'em Up:** A portable conveyor, Model SLJ-40 Speedlift, Jr., is the latest product of Speedways Conveyors, Inc. (Buffalo, N.Y.). The firm claims it is well suited for loading or unloading from balconies, mezzanines or upper floors because of its under-carriage construction that permits the conveyor to overhang. It can be adjusted to any angle, comes in varying lengths and belt widths, in standard speed or variable speed.

**Instrument Plants:** Beckman Instruments, Inc. (Pasadena, Calif.) has broken ground on a new, \$2-million instrument factory and administrative building in Pasadena.

• Also in Pasadena, Consolidated Engineering Corp. has decided to build an "Instrument Park" if the Pasadena Planning Commission gives permission for a zoning change to permit light manufacturing use of a 20-acre site north of the company's Hastings Ranch plant. Described by Consolidated President Philip S. Fogg as a "reassertion of our community's bid for world leadership as an instrument center," the park would be the site of a building for engineering and research and a plant that would be a duplicate of the present one. It would centralize Consolidated's activities, now spread out in several Pasadena locations.



The name BAGPAK is a standard of leadership, and of quality... for BAGPAK means complete production control in bag manufacture, from the planting of seedlings which eventually produce pulp, to the delivery of the finished sack to your plant—in fact, even to the furnishing of special filling and closing machines to insure the best protection for your product.

Multiwall Paper Shipping Bags are described in the above brochure. For your copy, write to Bagpak Division, International Paper Company, 220 East 42nd St., New York 17, Dept. K-9.

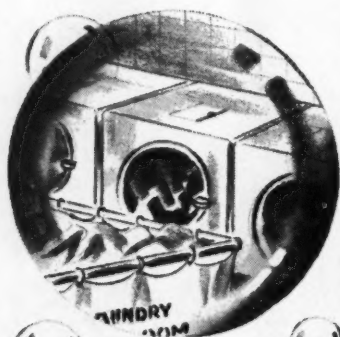
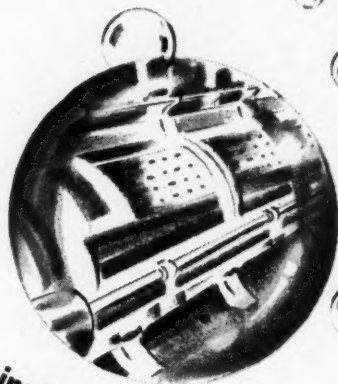


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\*Trade Mark Reg.

# DISTRIBUTION..

## Distribution Channels

In addition to E. R. Squibb & Sons' Denver opening (*see below*), other major changes are being made in the industry's distribution channels:

- The American Resinous Chemicals Corp. and the American Polymer Corp. (Peabody, Mass.) have appointed Cleveland's Schibley Solvents & Chemical Co. as their sales agent for the state of Ohio.

- The Pennsylvania Railroad is planning to build a multimillion-dollar barge terminal on the Ohio River at Cincinnati, Ohio. The terminal would connect by pipeline with the oil-storage tank farm near the city's Lunken Airport.

- Metro-Atlantic, Inc. and its subsidiary, Metro Dyestuff Corp., have opened Southern headquarters at Greenville, S. C.

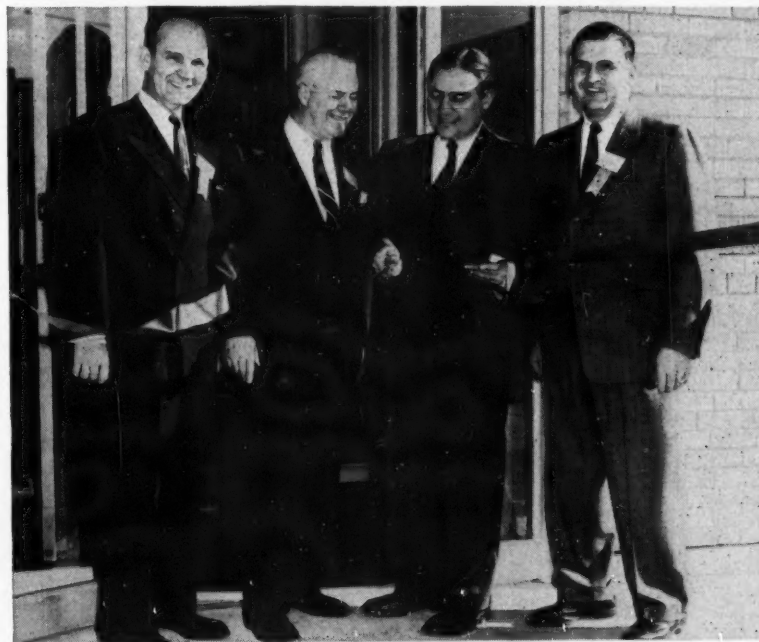
- The Industrial Tape Corp. (New Brunswick, N.J.) has opened its eighth warehouse, this one at Dallas, Tex.

- The Phillips Petroleum Co. is constructing a 235,000-barrel marine terminal at Tampa, Fla. Projected completion date: August 1.

**Intermediate:** The Anderson Laboratories (Weston, Mich.) has commenced the commercial production of 6-methoxy-8-aminoquinoline, an intermediate used in the manufacture of antimalarial medicinals.

**Loan for Brazil:** The McGraw-Hill "International Trader" reports that a U. S. loan to Brazil is now a definite prospect. This will facilitate the reduction of Brazil's towering stack of commercial debts to U. S. exporters.

**In the Flour:** Sterwin Chemicals, Inc., after a six-year development period, is now launching a complete bleaching and maturing service for flour mills. Heart of the process is a simplified chlorine dioxide dispensing apparatus that Sterwin supplies with dioxide.



## Rocky Mountain Opening

HIS HONOR, the mayor, was on hand to cut the satin ribbon when E. R. Squibb & Sons officially opened its new Denver, Colo., sales office and warehouse.

Accompanying Denver's Mayor Quigg Newton at the focal point of the ceremony are (l. to r.) Squibbmen M. A. Fortner, division sales man-

ager; J. J. Toohy, vice-president; and J. T. Kelly, branch manager.

The new facilities will serve a seven-state area including Colorado, Wyoming, Utah, and parts of New Mexico, Arizona, Nevada and Idaho.

Nearly 2,000 doctors and pharmacists brought their families to help celebrate the Rocky Mountain opening.



D&O Industrial Odorants can paint your sales picture in bright new colors. Soaps, plastics, waxes, synthetic detergents, paints, polishes, petroleum derivatives, rubber, glue, insecticides, moth specialties, room deodorants and cleaning fluids—all take on shining new sales appeal, at little added cost, with D&O Industrial Odorants. Let us solve your odor problem. Write today for catalog, samples and specific information.



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## QUANTITATIVE ANALYSIS and the PLAXPAK BOTTLE

**THE YOUNG SCIENCE** of Flame Photometry, with the simplified equipment developed by White Company and built by Baird Associates, uses the unbreakable, non-toxic, Plaxpak® polyethylene bottle.



**IN CASES OF SHOCK**, various diseases such as diabetes, Addison's disease, hypertension, combat fatigue and many others, an imbalance in the levels of sodium and potassium in blood and body fluids exists. It is frequently the cause of death. In emergencies and cases of post-operative shock, speed is essential in determining these levels.

With old-fashioned, cumbersome Flame Photometry equipment, this determination was a tedious and not always accurate process. Solutions used as testing reagents could not be kept on hand for emergency use, since even fine glass containers leach sodium potassium and other alkalis into dilute solutions used.

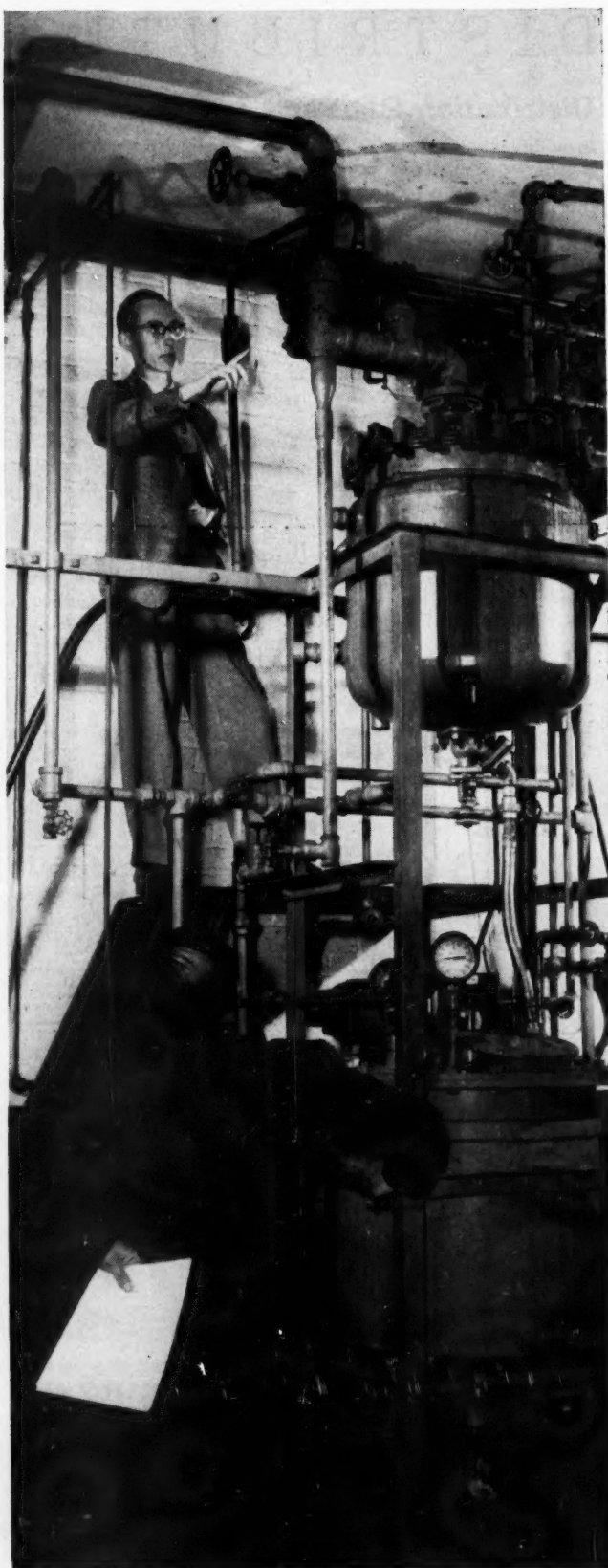
**INERT TO MOST CHEMICAL ACTION**, Plaxpak polyethylene bottles do not alter the characteristics of weak aqueous solutions. In addition, their unbreakability and easy handling properties speed up the new life-saving technique which is being used in modern hospitals and with medical units of the armed services here and abroad.

This new technique in Flame Photometry is not confined to medicine. Industrial applications are numerous. In ionics, for example, it has led to a cheaper, more certain method of turning salt water into a potable brew.



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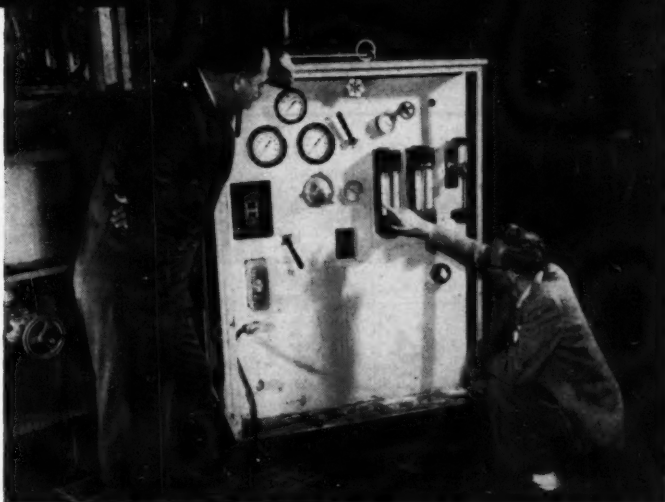
**1** PILOT PLANT details are explained to customer by Continental's Ken Gerhart. Sulfonating unit is at top; neutralization unit, below.

## DISTRIBUTION. . . . .

ONE FEATURE of the rapid swing from soaps to detergents is that every soap maker—and almost any other chemical concern—is a potential manufacturer of detergent-type cleaners. This presents a broad market opportunity for suppliers of detergent raw materials.

But it also poses a problem. For although most of the prospective customers have a basic knowledge of the detergent industry, they still need to be filled in on the special technology of synthetic detergent manufacture—as compared with the production of soap.

One of these raw material suppliers, the Continental Oil Co., is whipping



2 SULFUR TRIOXIDE process for sulfonating dodecylbenzene starts with this air drying and gas dispensing mechanism.

## Selling Through the Pilot Plant

this problem by using its Baltimore, Md., sulfonation pilot plant as a highly effective selling tool to promote Continental's sales of dodecylbenzene, a widely used starting point for detergent sulfonates.

This week the CW Camera went to Baltimore's Fairfield suburb to see how the oil company's system operates.

The pilot plant itself is a miniature synthetic detergent production line housed in a red-brick building near the center of Continental's sprawling ex-refinery. As such, it serves as a well-equipped, expertly staffed sales-service laboratory where, under the supervision of Ken Gerhart, the company can regularly conduct technical discussions and process demonstrations for its dodecylbenzene customers.

These "cram courses" may last anywhere from a day to two weeks—with follow-up sessions as requested by the customers.

Supervisor Gerhart, after a preliminary talk on the characteristics of his company's dodecylbenzene, proceeds rapidly to such subjects as process operation, quality control, and equipment design.

The pilot plant and laboratory provide handy props for the subject matter under discussion.

And after the customers have returned home to their own plants, the Continental staff tries to maintain contact with their operations, offering suggestions and helping to resolve knotty plant problems when they come up.

**Two in One:** The sulfonation pilot plant is, in many respects, leading a double life.



3 CUSTOMER learns details of detergent analysis and quality control from Andy Appel, chemist in pilot-plant laboratory.



4 APPLICATION of pilot-plant principles to industrial-sized equipment completes Gerhart's "short course" on sulfonation.

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## DISTRIBUTION . . . . .

When Continental converted its Baltimore refinery to petrochemicals (as a part of the now-dissolved Sharples - Continental organization), the company's end product was dodecylbenzene made by the alkylation of local steel-company benzene with Continental's dodecene (average weight: C-12) shipped in by water from its southwestern refineries.

Subsequently, the decision was made to acquire a large-scale dodecylbenzene sulfonation plant at Chicago to supply that local industrial market. The pilot plant at Baltimore provided the experience needed to operate its big brother in Illinois—and it is still used as a proving ground for the continuing improvement of the industrial unit.

But at the same time, the capacity of Continental's Baltimore alkylation plant has been tripled in the past year, giving Continental ample supplies of dodecylbenzene for direct distribution. The result: a vigorous eastern sales campaign in which the pilot plant plays a large part.\*

**Anhydrous:** Among the advantages which Gerhart claims for his sales-service laboratory is its flexibility to explore the new, as well as to demonstrate the proved processes.

Currently under study is the use of anhydrous sulfur trioxide as a replacement for sulfuric acid or oleum in the sulfonation of dodecylbenzene. From the pilot plant's experience to date, several advantages for the trioxide process appear to be possible. Among these are:

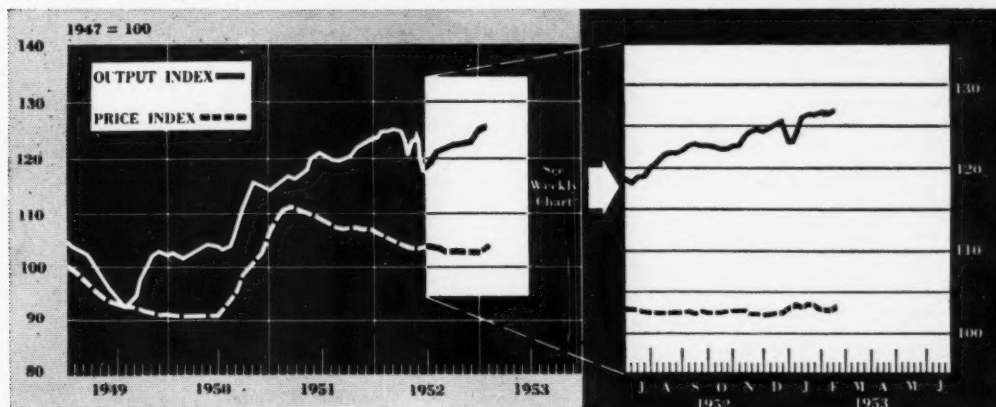
- A substantial reduction in total processing time.
- A lower percentage of excess acid, resulting in less caustic or amine for neutralization.
- Improved odor in the final product, which is important in household detergents.
- Elimination of the spent-acid disposal problem.

Claiming that raw material costs should balance out, and that a plant can be converted with major changes primarily in the heat exchangers, Gerhart is quick to temper his remarks with the observation that sulfuric anhydride is a tricky, hazardous material that requires experience to handle safely.

But sulfur trioxide or sulfuric, whichever the customer wants to discuss, the pilot plant staff is well equipped to do its part in backing up Continental's sales effort.

\* Among Continental's dodecylbenzene competitors are such companies as Atlantic Refining Corp., Monsanto Chemical Co. (Phosphate Div.), Oronite Chemical Co.

# MARKETS . . . . .



CW Index of Chemical Output—Basis: Total Man Hours Worked in Selected Chemical Industries  
CW Price Index—Basis: Weekly Prices of Sixteen Selected Chemicals

## MARKET LETTER

The government may finally sell 24 of its 28 synthetic rubber plants—for a price. Rep. Paul W. Shafer, House Armed Services Rubber Subcommittee head, thinks that private business should be happy to lay out \$350 million, take over the works.

Possible government alternative if private cash is not forthcoming: raise the synthetic rubber price in order to operate on a reasonable profit basis.

Medicinals and pharmaceuticals are the latest aid to Greece, and it means sales for U. S. drug firms. The Mutual Security Agency has granted that country an authorization to import \$500,000 worth, including \$200,000 of antibiotics, from U. S. or Canada.

There's just too much sugar around. Cuban producers are warning this country that we must join in holding the line against heavier production in order to prevent collapse of the industry and Cuban economy.

And the alcohol producers are not helping matters in Havana. Practically none of the new molasses crop is moving to the distillers.

Chief reason: alcohol makers loaded up what they needed from last year's 41½¢/gallon crop.

"Unprecedented demands by the refrigeration, radio, television and wall tile industries in the Midwest." That's today's styrene molding compound market, according to David Guarnaccia, Monsanto's thermoplastic sales manager. And Monsanto is now able to supply requirements from its new Port Plastics, Ohio, plant. Initial shipments started last week.

Adipic acid production objectives got a second look from the Office of Defense Mobilization. As a result, ODM sliced 19 million lbs. from the original 246-million-lb. planned expansion goal. Reason for the cutback: Increased use of other chemicals in production of adiponitrile for polyamide fibers (nylon).

Tallow producers, overburdened with supplies, will get some cheer from a recent Japanese Government action. All important applications for

## MARKET LETTER

### WEEKLY BUSINESS INDICATORS

	Latest Week	Preceding Week	Year Ago
CHEMICAL WEEK Output Index (1947=100)	126.7	127.0	124.8
CHEMICAL WEEK Wholesale Price Index (1947=100)	103.2	103.1	104.0
Stock Price Index of 14 Chemical Companies (Standard & Poor's Corp.)	254.7	263.1	228.0

### MONTHLY INDICATORS—Foreign TRADE (Million Dollars)

	MANUFACTURERS' SALES			MANUFACTURERS' INVENTORIES		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
Chemicals, total	\$24,200	\$23,465	\$20,962	\$43,630	\$43,578	\$43,039
Coal tar products	1,548	1,532	1,419	2,936	3,009	2,984
Medicinals and pharmaceuticals	666	663	621	991	974	986
Industrial chemicals	2,031	2,059	1,937	2,743	2,805	2,600
Fertilizer and fertilizer materials	1,120	1,084	1,122	2,660	2,743	3,045
Vegetable oils and fats, inedible	281	234	238	549	545	613

tallow (\$1,653,000's worth) submitted before February 5 are now receiving authorization under a scheme of automatic approval.

Also covered by the Japanese import move: \$6,966,000's worth of soybeans.

With controls off still more commodities and further decontrol expected imminently:

- Price of beauty will not rise, according to Steve Mayham, exec. v.p. of the Toilet Goods Association. Mayham branded as "completely false and unwarranted" the statement by the Office of Price Stabilization that decontrol would spell a consumer price rise of 10% on cosmetics.

- Sulfur prices, on the other hand, may be expected to rise once the ceiling is lifted, if industry spokesmen have their way. One casualty of the ceiling they singled out is the mines in Sicily, which haven't operated since the war. And Italian export figures, just released, also show a sharp drop. In 1952, 51,620 tons of raw sulfur were exported; corresponding 1951 figure, 80,256 tons.

- Other chemicals rumored for rises, if given a chance: chlorine and soda ash. So far, producers are just living on hopes. But they are making out a case based on investment cost increases. Today, it costs about twice as much to set up in business as it did pre-World War II.

Fertilizer is much in the news right now: In Brazil, imports are expected to decline this year. Reason: shortage of foreign exchange.

At Sfax, Tunisia, the largest and most important phosphoric acid installation is slated to go on-stream next month. The company: Societe Industrielle d'Acide Phosphorique et d'Engrais. It's using low-grade rock from southern Tunisia.

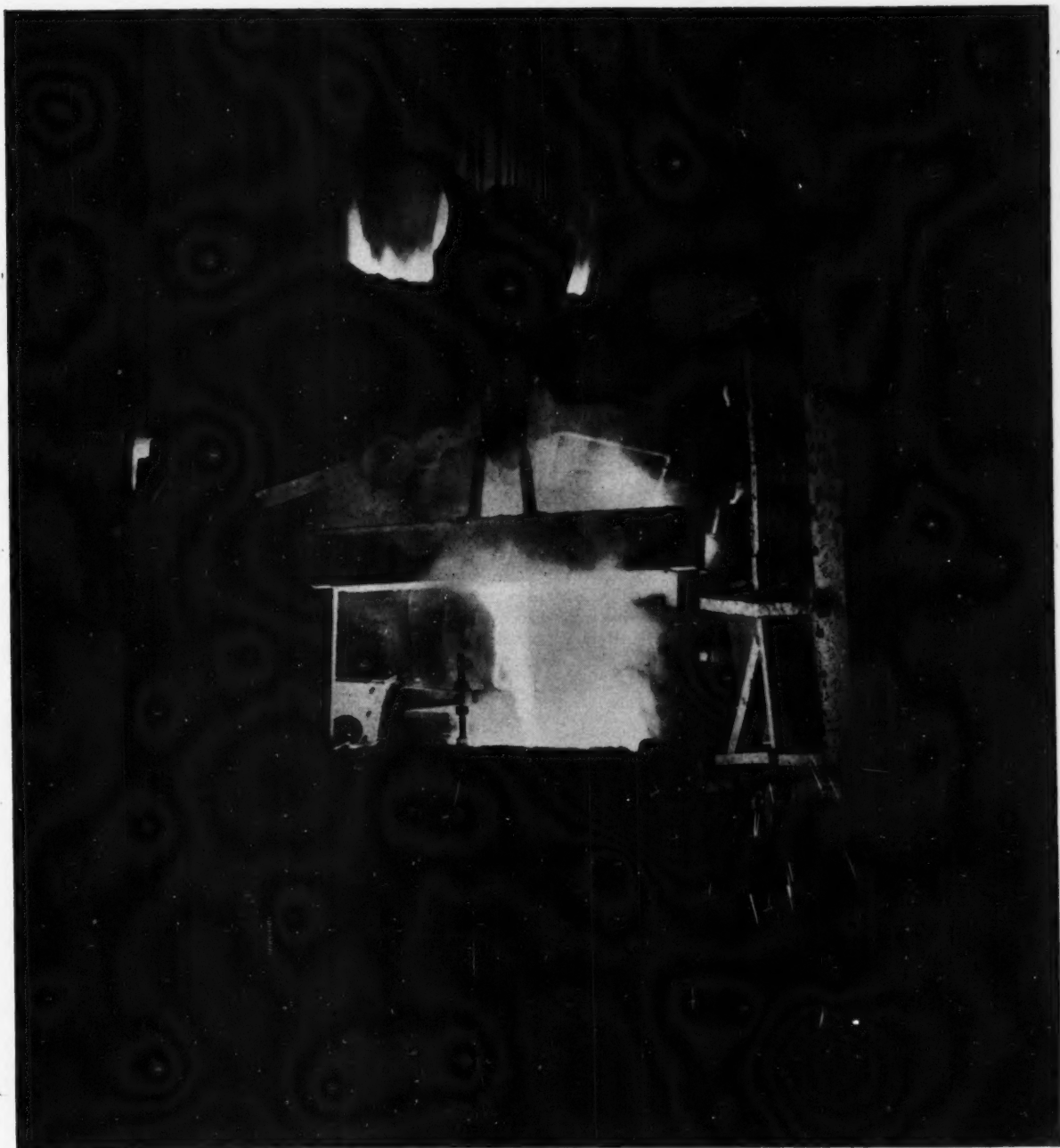
The Austrian fertilizer industry is continuing to boost output. At Linz, "Oesterreichische Stickstoffwerke" produced 463,000 tons of lime-ammonium nitrate last year, is shooting for more than 500,000 tons in 1953.

And in Turkey, under the supervision of the Agricultural Bank, superphosphate will be forthcoming. The plant, in which U. S. capital is interested, is expected to use sulfuric acid from a factory to be established at Murgul for the recovery of sulfur from smelter gases.

### SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending February 20, 1953

UP	Change	New Price		Change	New Price
Nickel nitrate, bbls., works	\$ .07	\$ .39½	Linseed oil, raw, tanks, F.O.B. Minneapolis	\$ .005	\$ .152
DOWN	Change	New Price			
Carnauba wax, No. 1, yellow	\$ .02	\$1.31			

All prices per pound unless quantity is stated.



*The Steel Industry* in the United States produces almost half of the world's supply. Pennsalt Chemicals . . . including hydrofluoric, sulfuric and other acids; ammonia, sal ammoniac; alkaline cleaners and corrosion-resistant cements and coatings... help this vital and aggressive industry to maintain its leadership.

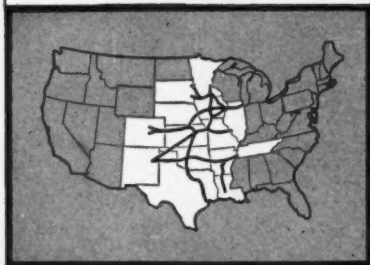
**PENNSYLVANIA SALT MANUFACTURING COMPANY**

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February 28, 1953 • Chemical Week



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## MARKETS . . . . .

## New Fibers Mean New Markets

The United States public is about to witness another round of the battle for the textile market. The invasion slated to start this year by the so-called "miracle" fibers will mark a renewed onslaught upon the natural fiber market.

You'll be hearing a lot more about Dacron, Orlon, Acrilan, Dynel, Vicara, etc., in the months to come. Some of them barely out of the laboratory into commercial production, they're shooting for a 500-million-lb. annual output within the next three or four years. For comparison purposes, that's more than the entire U.S. consumption of wool in 1952.

All these fibers add up to a tremendous boost in the chemicals from which they're fashioned. It's a continuation of the trend that began about 40 years ago with the advent of rayon. Some time later came acetate, bringing with it swelling consumption of the raw materials from which it is made.

Again, some exclusions might be missed; sulfuric acid, for one, could be cited as a necessary base for certain vital components.

But, over-all, the list is intended to convey the idea that many materials will be participating closely in the phenomenal rate of production growth of the new fibers.

Just how fast they have already moved along is revealed by U.S. Dept. of Commerce; the new synthetics have, over the past 12 years, enjoyed an average annual growth rate of over 40%.

In contrast, the rayon and acetate industry has progressed at a more modest 9% a year. And the old, established fibers have barely gained in the same period. Possibly, on an average, cotton and wool, linked to the natural population increase, gained only 2 or 3% each year.

To form some estimate of what is ahead for the new fibers (and particu-

Table I

### Building Blocks for Man-made Fibers

Primary Components	Secondary (derived) Components
acetylene	acetaldehyde
ammonia	acetic acid
benzene	acetic anhydride
butadiene	acrylonitrile
butylene	adiponitrile
calcium cyanamide	ethanol
chlorine	ethylene dichloride
cyclohexane	ethylene glycol
ethylene	ethylene oxide
furfural	formaldehyde
methanol	hydrochloric acid
para-xylene	hydrocyanic acid
sodium cyanamide	terephthalic acid
	vinyl acetate
	vinyl chloride

But the new chemical markets opening now differ considerably from the effects of, say, rayon. Whereas rayon (and acetate) start with a natural fiber and use only a few kinds of chemicals, the formation of these new fibers will employ a veritable host of materials.

A roster of new chemicals, plus the well-established items that will partake in the expansion, might appear as in Table I. (Nylon ingredients included.)

Necessarily the list is somewhat arbitrary. For example, ethanol might be classed as (a) primary—if produced from grain or molasses or (b) secondary—when made synthetically.

larly, the chemicals from which they will come), a study of their growth curve compared to the past growth of rayon may be enlightening. Roughly, the new synthetics have reached a stage comparable to rayon in 1929.

Starting at that year, and speaking in terms of materials used, CHEMICAL ENGINEERING'S Index of Industrial Consumption of Chemicals gives these figures for rayon:

### Index of Consumption

1929	2.92
1937	7.97
1942	14.93
1947	22.69

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STAINLESS STEEL VALVE COMPARISON CHART				
BASED ON 2" GATE	COOPER ALLOY	COMPETITORS		
		A	B	C
Ball and socket rotating type disc for positive seating with minimum galling	✓	✓		
Discs and seats designed for simple reconditioning in the field	✓	✓		
Centerless ground stock to cut packing wear	✓	✓		
3/4" minimum stem diameter to assure rigidity	✓		✓	✓
Deep stuffing box with six turns of 1/4" square packing	✓		✓	
Packing gland designed to deliver square, uniform compression	✓			
Two piece gland construction to prevent gouging of the stem	✓	✓		✓
Swinging eyebolts to simplify repacking and provide added safety	✓			
Simplified yoke nut construction to permit replacement without interrupting service	✓			✓
Grease fitting to eliminate friction on yoke nut during opening and closing	✓			
100% x-ray of vital cast components	✓			
A stainless steel valve designed and produced by stainless steel specialists	✓	✓		
Stocked in major industrial areas by nationwide distributor organization	✓		✓	✓
Rugged construction for tough corrosive service—compare these weights!	33-lbs.	28-lbs.	28-lbs.	24-lbs.
7" minimum diameter handwheel for simplified hand closing	✓			



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# PRODUCT CONTROL THROUGH INFRARED ANALYSIS

Number 7 of a Series of Data Sheets for Better Process Control from The Perkin-Elmer Corporation, Manufacturers of Infrared Spectrometers, Flame Photometers and Electro-optical Instruments.

## PROBLEM:

Determining oil and phenols in effluent water.

## DEVELOPED BY:

The Atlantic Refining Company,  
Philadelphia, Pennsylvania.

## SOLUTION:

Infrared analysis. Method is based on bromination of the phenols, extraction of the bromides from water with carbon tetrachloride, and measurement of optical density at 2.84 microns (for phenols) and 3.40 microns (for oils).

## INSTRUMENTATION:

Perkin-Elmer Model 12-A Infrared Spectrometer, LiF Prism, 50 mm glass cell with quartz windows.

## DISCUSSION:

The petroleum industry has long been concerned with elimination of both hydrocarbon oil and phenols from its effluent waters. A number of analytical methods are now in use but none has both sensitivity and accuracy desired for future pollution abatement programs.

Classical methods for determination of oil in water are limited to concentrations above 1 ppm.

### Infrared analysis:

Sensitive to 0.1 ppm of oil and 10 parts, or less, per billion of phenol, (see tables) with an accuracy better than that obtainable by existing methods—not affected by volatility of material being determined.

## REFERENCE:

"Infrared Spectrophotometric Determination of Oil and Phenols in Water."  
R. G. Simard, Ichiro Hasegawa, William Bandaruk and C. E. Headington, *Anal. Chem.* 23, 10 (1951).

### Sensitivity of Phenol Method

Compound	Phenol Present PPM	Phenol Found PPM	Recovery %
Phenol <sup>a</sup>	0.01	0.008	80
o-Cresol <sup>b</sup>	0.01	0.006	60
	0.012	0.016	133
	0.031	0.034	110
	0.049	0.054	111
	0.061	0.078	128

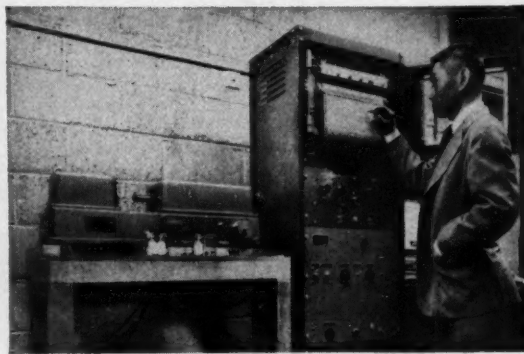
<sup>a</sup> Phenol calibration used.

<sup>b</sup> o-Cresol calibration used.

### Sensitivity of Oil Determination<sup>a</sup>

Waste Oil Added, PPM	Waste Oil Determined, PPM
1.2	1.1
1.2	1.0
0.1	0.1
0.1	0.1
0.0	0.04

<sup>a</sup> Water extracted with 10 ml of CCl<sub>4</sub> per liter.



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## MARKETS . . . . .

And based on *Textile Organon's* 1952 figure, just released, rayon chemical consumption index now estimates to this:

1952 26.80

If—and there are certain obstacles to be hurdled on the way—if the new fibers follow the path of rayon, this means that by eight years from now, these chemical fibers will need 2½ times the raw materials they're taking today. And in another five years (by 1966) the consumption will double again.

Even if these hopes of the chemical industry don't all materialize, it is easy to understand the enthusiasm of the manufacturers.

To see just how this works out in terms of specific chemicals, take sulfuric acid as an example. Even in this huge industry, the needs of a fiber are distinctly appreciated. The record looks like this:

Consumption of Sulfuric Acid in Rayon and Film

	Short Tons (100% acid)	% of total consumption
1929	93,000	1.8
1937	237,000	4.4
1942	390,000	5.0
1947	610,000	6.1
1952	700,000 (est.)	6.3 (est.)

Some chemicals already enjoy a large market, but the additional requirements are so great that even in such a case, the new product becomes a factor in the industry. Caustic soda consumption is an example. Figures for rayon and film use are these:

Consumption of Caustic Soda in Rayon and Film

	Short Tons	% of total consumption
1937	186,000	18.8
1942	300,000	20.5
1947	455,000	21.3
1952	475,000	21.1 (est.)

Carbon bisulfide is an instance where a fiber (rayon) has dominated the market. Early production figures are not available but it would be safe to say that viscose rayon has written the story of carbon bisulfide expansion. Here are some typical figures:

Consumption of Carbon Bisulfide in Viscose Rayon

	Millions of Pounds	% of total consumption
1942	153	57.3
1947	242	62.6
1952	280	65.0 (est.)

And another similar case is that of acetic anhydride. Here, as the fiber (this time acetate) has grown, so has the chemical.

Consumption of Acetic Anhydride in Acetate

	Millions of Pounds	% of total consumption
1937	141	79.4
1942	317	73.6
1947	460	72.8
1952	539	75.0 (est.)

The above tables show how the rise of one industry carries with it increased consumption of raw materials.

Many other materials, of course, profit from the rise of the textile industry. But where a chemical is not integrally involved in making the fiber, the benefits are relatively small. In the field of such items as dyes or finishing chemicals, no startling growth results.

Just to show how this works, take the dyes. During this same period when rayon was absorbing ever-greater amounts of sulfuric acid, caustic soda, etc., it made little difference to the dyeing industry. The figures for dye consumption (including non-textile) look this way:

	Millions of pounds
1929	111.4
1937	122.2
1942	151.9
1947	212.3
1951 (latest figures)	185.7

What happened here, of course, is simply that as rayon and acetate competed with the older fabrics, whatever might have been used in cotton or wool now appeared elsewhere. Result: no increase beyond normal population growth rate.

Cost and availability of raw materials are critical factors determining just how far the new fibers will travel. Right now, the search is on for the cheapest and simplest building blocks.

For manufacturers well know that a large factor in the meteoric rise of rayon has been the ability of its makers to cut the price. In 1952, viscose staple tags averaged just 0.7¢/lb. higher than cotton (39.5¢ vs. 38.8¢).

**Prizes For All:** With the line-up of raw materials now taking shape, expansion of synthetic fiber production means rocketing requirements for the chosen list.

More fundamentally, though, new markets are being created for virtually every basic chemical. Chemical suppliers, with big stakes to gain and nothing to lose, can be justifiably excited over the current invasion of the textile field by the chemical fibers.

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# SPECIALTIES . . . . .



**HULL INSPECTION:** Antifoulers for cleaner hulls and faster ships.

## Reducing the Barnacle Bill

Parasites are the problem. Toxicant-loaded paints—copper and mercury salts are the top poisons; vinyl vehicles are the most encouraging film-formers—seem to be the solution.

It all adds up to a multimillion-dollar market in compounds to prevent marine fouling—fouling that costs the shipping industry over \$100 million a year.

Their dealers haven't heard it yet; and the price hasn't been set. But the Glidden Co. (Cleveland) is jumping feet first into the antifouling marine paint field with its Vinyl-Cote.

News that Glidden is readying a major marine line for both the small

boat owner and the big shipper ties in with the reports of the 10,000-ton freighter *George S. Lawson*, found barnacle-free after a full year at sea (*see cut*). The *Lawson* was one of the numerous ships testing the antifouling compound Dianol, a ship-bottom paint

additive produced by Dianol, Inc. (St. Petersburg, Fla.).

Even without these events to remind them, the shipping industry is fully aware of the fouling problem. An old and much-quoted figure for the annual U.S. shipping loss to marine parasites is \$100 million. And the cost of drydocking, scraping and repainting a ship like the U.S.S. *United States* is put at \$75,000.

It must be pointed out, however, that commercial ships are dry-docked and inspected yearly, under any circumstances. If anti-fouling and anti-corrosion paints have done their job, however, there is that much less labor, that much less time lost.

The private boating enthusiast and the commercial fisherman face fouling problems, too. Altogether, it adds up to a multimillion-dollar market for antifouling paints: 4.8 million recreational craft; and nearly 90,000 fishing vessels, freighters, and liners.

## POISONS

Since the days of copper-sheathed wooden hulls, (from about 1758 until the advent of iron and steel ships), copper and its oxides and arsenates, as well as mercury compounds (oxide and chloride) have been the most effective fouling preventives.\*

Nearly everything conceivable, from atropine to Javanese arrow poisons have been tried as sea-parasite preventives. Nevertheless, it's still pure copper (about eight pounds of copper powder are used in Metallic Coatings Corp.'s Coperoyd, for example) and copper oxide that are used most. The Maritime Commission specifies 4.25 lbs. of the toxic cuprous oxide, 0.21 lbs. mercuric oxide per gal. of paint; some tropical types have up to six lbs. of copper oxides

For the most part, organic toxicants, such as organic arsenicals and DDT, have shown some limited effectiveness, but don't match the heavy-metal salts. Dianol, however, is claimed to contain no metallic salts. Inventor Robert Spiers can't reveal composition of his unpatented product; it is labeled as an organic antifouler, non-toxic to warm-blooded animals, and operates, according to one account, by paralyzing nerves of cold blooded organisms that try to grow on it. Dianol is added to ordinary antifouling paints, is said to more than triple the effective period of such paints.

\* Marine Fouling and its Prevention, prepared for the Navy's Bureau of Ships by the Woods Hole Oceanographic Institution is the best and most recent comprehensive work on ship fouling problems.

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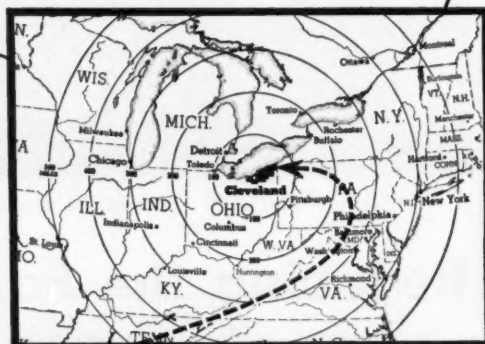
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## SPECIALTIES . . . . .

### VEHICLES

Vital as poisons are to prevention of fouling, the paint film carrying the toxicant (which, almost without exception, is cuprous oxide and/or mercuric oxide) is likely even more important.

Vinyl bottom paints, such as in Glidden's Vinyl-Cote, stem from research of the Bakelite Co. (Div. of Union Carbide & Carbon) during World War II. Both vinyl acetate-chloride copolymers and butyral have shown worth, and a number of paints utilizing them (Baltimore Copper Paint Co.'s Vinyltex No. 55; International Paint Co.'s Viny-Lux; C. A. Woolsey Paint & Color Co.'s Vinelast, for instance) have been on the market for some time. Generally, the vinyl butyral is for primers, the co-polymer for anticorrosion and antifouling paints.

A vinyl undercoat (wash coat—vinyl plus phosphoric acid and zinc chromate) has been recommended by the Maritime Commission for some time, to be used with a variety of anticorrosion and antifouling paints. It offers an exceedingly adherent base for the anticorrosives, which some authorities feel are the true keys to antifouling protection.

As they see it, almost any antifouler will do, provided it doesn't wear off. That's where several coats of a good

anticorrosion paint pays off—the antifouler stays where it can do some good.

But for the average yachting fan, more common vehicles are used. Shellacs, natural resins, synthetic resins (phenolics, coumarones) and, infrequently, cellulose are used. (Alkyds are largely confined to undercoatings, primers, anticorrosives.) Frequently the aim of a boat owner is a sleek, hard finish, often gained at the expense of antifouling characteristics. Nearly every paint company offers a line of so-called marine paints.

**Hot and Cold:** Pride of the Navy is a coating requiring special application techniques, but offers from two to five years' protection. The Navy's coating: hot plastic materials—thermoplastic resins and waxes, loaded with enough copper oxide to be effective up to 10 years—sprayed on at 300 F, to provide a 10 mil coat at a cost of about 10¢/sq. ft. The heavy coating also has the prime advantage of extreme corrosion resistance.

American Marine Paint Co. (San Francisco) has some patents controlling hot plastic coatings, and just last month William J. Francis, at the Norfolk Naval Shipyard, received a patent for a paint of this type.

Cold plastic coatings, somewhat easier to put on, have been used for years, principally by the Navy and Coast Guard. The material cost (about 3½¢/sq. ft. for a 6-mil coating) has been deemed too high for its benefits, most commercial ship owners say.

### MECHANISM

Beside varying in application, cost and composition, antifouling paints varying in mechanism of leaching the poison.

Essentially, the poisons are effective because they dissolve, surrounding the surface with a toxic barrier\*. This has been shown by numerous tests; the problem is to release the precise amount of toxicant to prevent fouling, without losing the poison too fast through solution and mechanical abrasion of the water. It was a problem even with copper-sheathed wood vessels to keep the coating from wearing away.

But the paints themselves act in two general ways according to Woods Hole authorities:

- Insoluble matrix paints,—vinyl films, for example—have a very high toxicant loading (more than 35% by volume). Because the tough film doesn't dissolve, particles must be present in quantity enough to be in

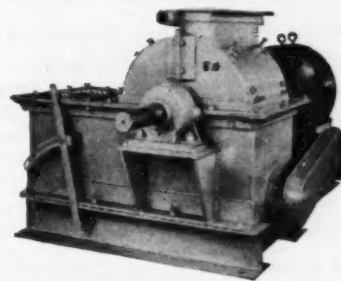
\* Dianol is said to be insoluble in seawater.



### Chameleon Car

COLOR-CHANGING automobile, like the model shown here by inventor M. L. Lacy, was on display at the Motor Sports Show in New York this week. Car top is two-layer plastic; by pumping in colored oil, the hue of the auto top can be varied.

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## SPECIALTIES . . . . .

continuous contact throughout the film. There is a high leaching rate of the poison at the start, but as the toxicant dissolves, this leaching slows down, eventually to the point where it is no longer effective. In some cases, addition of pigment assists in permitting continued solution of the copper oxide.

- Soluble matrix paints—rosin, with other resins, etc.—require a lower toxic loading (about 17% by volume). As the film is destroyed, the layer of copper oxide is constantly renewed. Toxic pigments such as arsenicals and zinc compounds can be used in both types of paints, but their value from an antifouling standpoint is doubtful.

### PRODUCERS

Probably the largest producer of anti-fouling paints is International Paint Co. (New York). Major West Coast producer is American Marine Paint Co. (San Francisco). Nearly all the large paint companies make some marine paints, but there is still plenty of room for a number of small companies that specialize almost exclusively in boat paints, like Pettit Paint Co. (Belleville, N.J.) and Paint Products Laboratories (Chicago).

Marine paint prices range from \$1.65 to \$30/gal. The more expensive paints are for the private owner; shippers seldom pay more than \$3.50/gal.

Too much emphasis cannot be placed on the importance of the anticorrosion under-layers. With steel vessels, they are probably more important than the antifoulers. There are a couple of new techniques here, too: Dow's *Marine Chemist*, a charter tanker, exemplifies the sacrificial cathodic corrosion protection. Magnesium bars, bolted to the hull, are preferentially last to protect the hull (CW, Nov. 8, '52).

Another variation of cathodic protection, which is giving the anticorrosion paints a run for their money, employs graphite electrodes, and as outside power source. "Mothball fleets" in various parts of the nation make use of such corrosion protection.

### PARASITES

There is a wide variety of marine growths that cause fouling. Barnacles are the best known—there are hundreds of species of them. But micro-organisms, too, as well as molluscs, worms (tube worms are most common) and a variety of plants, present trouble.

The problem of fouling varies from port to port, and from latitude to latitude. It is generally far worse in

the tropics than in temperate or arctic waters.

Fresh-water ports are guilty of fouling, too. Though barnacles will die when in fresh water (only the goose type, however, detaches when it dies), there is still extensive damage from plants. Bottom-paint formulations are

generally varied to meet the conditions the ships will encounter.

Centuries of experimentation have gone into bottom-paint formulation. Only in the past 20 years, however, has much been really accomplished. But by now it appears that the paints are adequate.



TEE-PAK's C. M. V. P.: To beat processing temperature, epoxy-cellophane.

## Epoxies Best for Wurst

Regenerated cellulose has proved its value as a packaging material. Nevertheless, as cellophane, it's had its drawbacks. Now, Transparent Package Co. (Chicago) has teamed cellulose with an epoxy coating, has come up with a versatile new film.

Controlled Moisture Vapor Permeability, or C. M. V. P. film, as Transparent Package ("Tee-Pak") labels its new product, has found immediate use in the meat-packing industry. It's working out fine as a casing for liverwurst and braunschweiger—liver-containing meats that have long been a packaging problem.

Up till now, "hog bung," the lower part of hog intestine, has been the only casing material. But it's no bargain—pricewise or visually, and it looks as if it has now lost out to cellulose.

Now under recently granted patents, Tee-Pak is producing a half-million 27-inch cases per month for these special meats. It's spent 3½ years working out the patented process for making the strong, stretchable tube with proper moisture barrier

qualities, and sees a potential of 10 million units per year for meat casing alone.

**Start to Finish:** The Tee-Pak's technical director, W. G. Tebbins, developed the process, which requires a special stretchable viscose tubing that the firm makes itself. The tubes are then coated with esterified Shell Epoxies (Shell Chemical Co.) in a paraffin wax. The tubes (colored throughout) have a film thickness of about 5 mils; the wax-Epon coat, 1½ mils.

The new coating far surpasses ordinary lacquered cellophane in several characteristics. The lacquer sometimes peeled off, wasn't flexible enough, and for liver products it couldn't withstand processing conditions. C.M.V.P. tubing, selling at \$90 per 1,000 pieces, easily takes the 3-4 hour cook at 180 F. And at nine cents per casing, compared to the hog intestine price of 55¢, the packer gets a durable casing that can be colorfully decorated.

With two patents already granted and four more on the way, Tebbins figures Tee-Pak has a firm grip on the liver casing market.

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## SPECIALTIES . . . . .

### Acrylic Emulsion Paint

Acrylic protective coatings, for consumer use, are possible with the new Rohm & Haas resin paint vehicle, Rhoplex AC-33.

The new material, a 100% acrylic dispersion in water, is almost ready-made for the paint producer. R&H claims the new vehicle practically eliminates need for additives to prevent putrefaction, mask odor, stabilize viscosity, or protect against freeze-thaw cycles.

And key advantages to the users of AC-33 based paints, R&H says, lie in the ease of stain removal and favorable reaction to scrubbing. After paints have dried overnight, lipstick stains, crayon marks, and the like can be removed by soap and water or with a mild scouring powder.

**Easy On:** Ease of application is another advantage, the firm says. Roller coating, brushing, or spraying can be used with equal facility. Dry to the touch in 15 minutes, the paints can be recoated almost as fast as a painter can work. All these advantages, R&H says, lie in the acrylic dispersion, which provides a chemically resistant, tough, non-brittling film, as the water (Rhoplex is supplied as a 46% solids dispersion in water) evaporates.

News of the new product comes on the heels of the announcement of the new R&H Houston plant for acrylic monomer production. The new unit will produce the raw materials for Rhoplex AC-33, which is supplied with a specific gravity of 1.04 and a pH of 9-9.5 at a cost of 28½¢/lb. in calroads of 55 gal. drums.

**Certified Buy:** Plant, equipment, inventories, trade marks and good will of the Canada Varnish Co., Ltd., Toronto, Canada, have been acquired by R. E. Edwards, president of Certified Paints, Ltd., also Toronto. A new firm, Canada Varnish Co., has been formed to continue manufacture and sale of products of the two companies.

**Viomycin Ready:** Out of the research stage now, and set for physician's use is the new antibiotic, Viomycin, made by Parke, Davis & Co. (Detroit). The new drug has shown effectiveness against Mycobacterium tuberculosis, the organism that causes tuberculosis in human beings.

**Dutch Export:** Luminous casein-emulsion paints for indoor and outdoor advertising use are now offered for export by the Dutch firm Koninklijke Fabrieken Talens & Zoon N. V., Apeldoorn.



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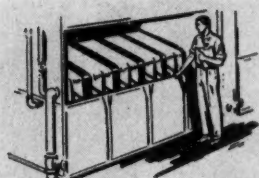
\*August, 1951 research study.

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IN DYE MANUFACTURE—For standardizing dyes.



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